ISO

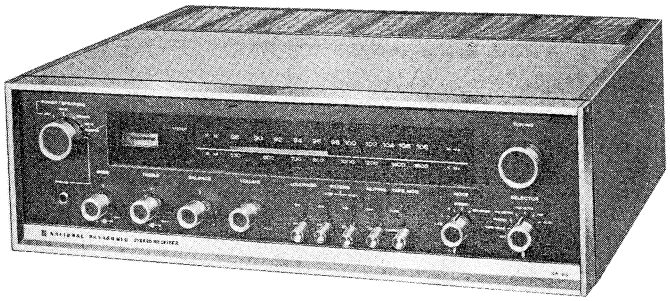
National NATIONAL

Service Manual

ORDER NO. SD-229

120-WATT FM/AM SOLID STATE STEREO TUNER AMPLIFIER

MODEL SA-65



SPECIFICATIONS

AMPLIFIER SECTION

IHF Music Power:	120 W (8Ω)
RMS Power:	50/50 W (8Ω)
Harmonic Distortion:	1%
Power Bandwidth:	15 Hz to 40 kHz −3 dB
Frequency Response:	
Auxiliary	20 Hz to 40 kHz ±3 dB
Power Amplifier	5 Hz to 100 kHz ±3 dB
Signal to Noise:	
Magnetic	60 dB
Auxiliary	70 dB
Residual Hum & Noise:	2 mV
Damping Factor:	30 (8Ω)
Sensitivity & Impedance:	
Microphone	1 mV, 47 KΩ
Magnetic	3 mV, 47 KΩ
Tape Head	2 mV, 150 KΩ
Auxiliary	300 mV, 100 KΩ
Tape Monitor	100 mV, 50 KΩ
Tone Control:	
Bass	50 Hz ±10 dB
Treble	10 kHz ±10 dB
Low Filter:	70 Hz −12 dB/oct
High Filter:	7 kHz −12 dB/oct

FM TUNER SECTION

Frequency:	88–108 MHz
Usable Sensitivity (IHF):	1.8 μV
Image Rejection:	100 dB (98 MHz)
IF Rejection:	100 dB (98 MHz)
Signal to Noise:	65 dB
Harmonic Distortion:	0.5%
Capture Ratio:	1 dB
Cross Modulation:	100 dB (98 MHz)
Antenna Impedance:	300 Ω Balanced
FM Multiplex Separation:	40 dB (1 kHz)

AM TUNER SECTION

Frequency Range:	525–1605 kHz
Usable Sensitivity (IHF):	20 μV
Image Rejection:	65 dB (1000 kHz)
IF Rejection:	60 dB (1000 kHz)
POWER COMSUMPTION:	50–280 W
POWER SUPPLY:	AC 110/120/220/240 V (50/60 Hz)
DIMENSIONS (W x H x D):	473 x 155 x 406 mm
WEIGHT:	15 Kg

TECHNISCHE DATEN

VERSTÄRKER TEIL

Musikleistung (nach IHF):	120 W (8Ω)
Nennausgausgangs leistung:	50/50 W (8Ω)
Klirrfaktor:	1%
Leist tungsbandbreite:	15 Hz bis 40 kHz −3 dB
Frequenzgang:	
Aux.	20 Hz bis 40 kHz ±3 dB
Endverstärker	5 Hz bis 100 kHz ±3 dB
Rauschabstand:	
Mag.	60 dB
Aux.	70 dB
Restbrumm und Rauschen:	2 mV
Dämpfungsfaktor:	30 (8Ω)
Empfindlichkeit und Impedanz:	
Mic. (Mikrophon)	1 mV, 47 KΩ
Mag.	3 mV, 47 KΩ
Tape head (Bandabspielger)	2 mV, 150 KΩ
Aux.	300 mV, 100 KΩ
Tape Monitor (Band monitor)	100 mV, 50 KΩ
Tiefenbereich (Bass):	50 Hz ±10 dB
Höhenbereich (Treble):	10 kHz ±10 dB
Tiefenfilter:	70 Hz −12 dB/oct
Höhenfilter:	7 kHz −12 dB/oct

UKW TUNER-TEIL

UKW Frequenzbereich:	88—108 MHz
UKW Eingangsempfindlichkeit (nach IHF):	1.8 μV
Spiegelselektion (bei 98 MHz):	100 dB
ZF Unterdrückung (bei 98 MHz):	100 dB
Rauschabstand:	60 dB
Klirrfaktor:	0.5%
Einfangsverhältnis:	1 dB
Kreuzmodulation (bei 98 MHz):	100 dB
Antennen:	300 Ω, symmetrisch
UKW Kanaltrennung (bei 1 kHz):	40 dB

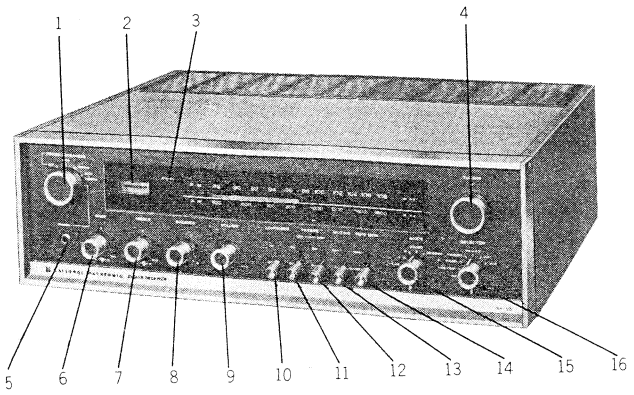
AM TUNER-TEIL

AM Frequenzbereich:	525—1605 kHz
AM Eingangsempfind lichkeit (nach IHF):	20 μV
Spiegelselektion (bei 1000 kHz):	65 dB
ZF Unterdruckung (bei 1000 kHz):	60 dB
LEISTUNGSAUFNAHME:	50–280 W
AC NETZSPANNUNG:	110/120/220/240 V (50/60 Hz)
ABMESSUNGEN (Breite x Höhe x Tiefe):	473 x 155 x 406 mm
GEWICHT:	15 Kg

<EXPORT DIVISION>
MATSUSHITA ELECTRIC TRADING CO., LTD.
P. O. Box 288, Central Osaka, Japan

MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.
RADIO and STEREO DIVISION

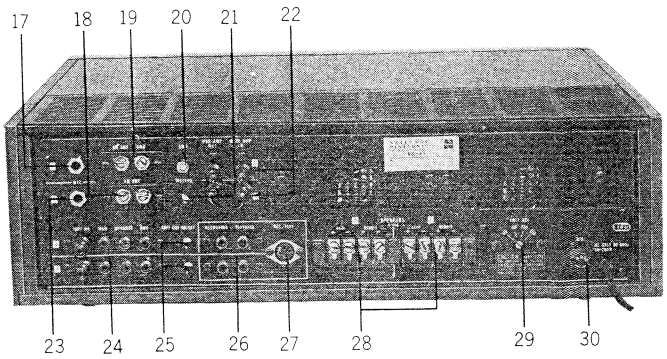
LOCATION OF CONTROLS



1. AC POWER & SPEAKERS SELECTOR SWITCH
2. TUNING METER
3. STEREO INDICATOR
4. TUNING CONTROL
5. HEADPHONES
6. BASS CONTROL
7. TREBLE CONTROL
8. BALANCE CONTROL
9. VOLUME CONTROL
10. LOUDNESS SWITCH
11. LOW FILTER SWITCH
12. HIGH FILTER SWITCH
13. MUTING SWITCH
14. TAPE MONITOR SWITCH
15. MODE SWITCH
16. SELECTOR SWITCH
17. MICROPHONE JACK (LEFT)
18. FM ANTENNA TERMINAL
19. AM ANTENNA TERMINAL
20. GROUND TERMINAL
21. MUTING LEVEL ADJUSTMENT
22. PRE AMP-MAIN AMP CONNECTOR
23. MICROPHONE JACK (RIGHT)
24. INPUT TERMINAL
25. TAPE EQUALIZER ADJUSTMENT
26. REC/PLAY TERMINAL
27. DIN SOCKET
28. SPEAKERS TERMINAL
29. VOLTAGE ADJUSTMENT
30. FUSE HOLDER

ANORDNUNG DER EINSTELLKNÖPEE

1. NETZSCHALTER UND LAUTSPRECHER BEREICHSSCHALTER
2. FELDSTÄRKENANZEIGE
3. STEREO-ANZEIGER
4. ABSTIMMKNOPF
5. KOPFHÖRER
6. TIEFENREGLER (BASS)
7. HÖHENREGLER (TREBLE)
8. BALANCE-EINSTELLER
9. LAUTSTÄRKENREGLER
10. LOUDNESS-SCHALTER (FÜR GEHÖRRICHTIGE LAUTSTÄRKE)
11. HÖHEN FILTER-SCHALTER
12. TIEFEN FILTER-SCHALTER
13. RAUSCHUNTERDRUCKUNGS-SCHALTER
14. TAPE-MONITOR-SCHALTER (TONBAND)
15. MODE-SCHALTER
16. BEREICHSSCHALTER
17. MIKROPHON (LINKER)
18. FM ANTENNE NANSCHLÜSSE
19. AM ANTENNE NANSCHLÜSSE
20. ERDE
21. DÄMPFEN EBENABGLEICH
22. PRE AMP UND POWER APPLIFIER-Anschlu*B*
23. MIKROPHON (RECHTER)
24. EINGANGSKLEMMEN
25. TAPE ENTZERREABGLEICH
26. TAPE-MONITOR-BUCHSEN (TONBAND)
27. DIODENBUCHSE (TONBAND)
28. LAUTSPRECHERANSCHLÜSSE
29. NETZEINSTELLUNG
30. SICHERUNG SHALTER



TO REMOVE CHASSIS

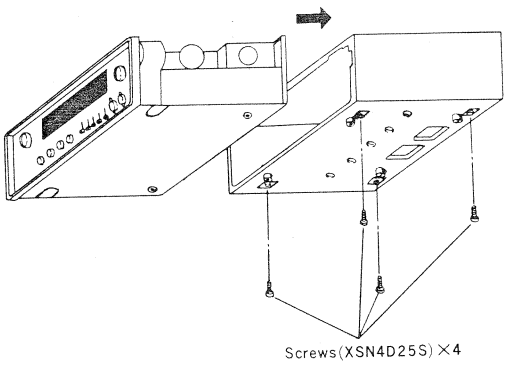


Fig. 1 ABB. 1

1. Remove four (4) cabinet-mounting screws, as illustrated in fig. 1.
2. Remove cabinet from chassis.
3. Remove fourteen (14) chassis-mounting screws, as illustrated in fig. 2.
4. To reassemble, reverse the above procedure.

AUSBAUEN DES CHASSIS

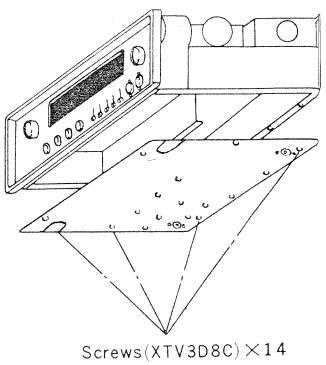
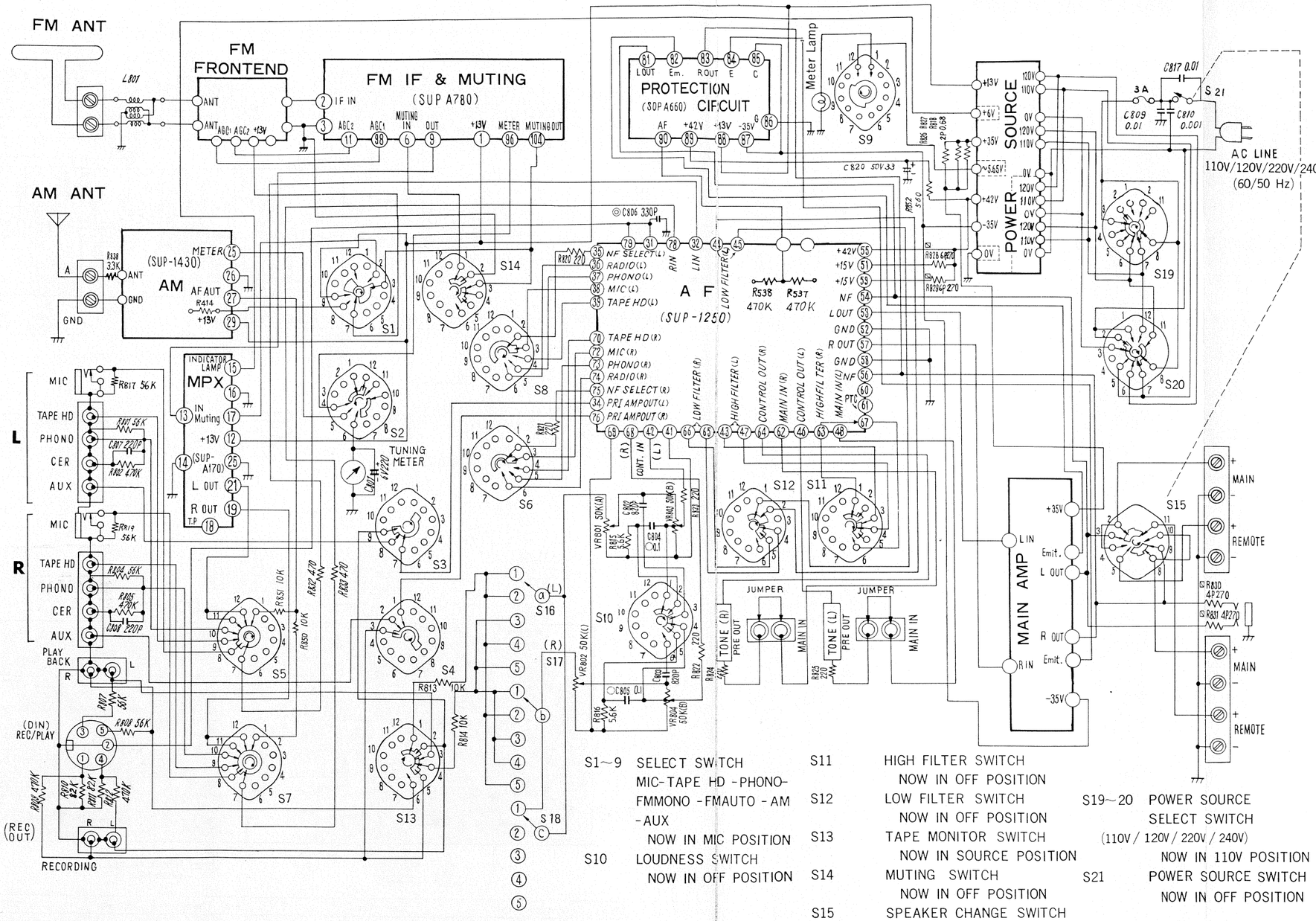


Fig. 2 ABB. 2

1. Vier (4) Gehäuse-Befestigungsschrauben. (Vgl. Abb. 1
2. Gehäuse vom Chassis abnehmen.
3. Vierzehn (14) Chassis-Befestigung sschrauben. (Vgl. bb. 2)
4. Beim Zusammenbau in umgekehrter Reihenfolge vo[illegible]ren.

BLOCK DIAGRAM MODEL SA-65

BLOCKSCHALTBILD



S1～9 SELECT SWITCH
MIC-TAPE HD-PHONO-FMMONO-FMAUTO-AM-AUX
NOW IN MIC POSITION

S10 LOUDNESS SWITCH
NOW IN OFF POSITION

S11 HIGH FILTER SWITCH
NOW IN OFF POSITION

S12 LOW FILTER SWITCH
NOW IN OFF POSITION

S13 TAPE MONITOR SWITCH
NOW IN SOURCE POSITION

S14 MUTING SWITCH
NOW IN OFF POSITION

S15 SPEAKER CHANGE SWITCH
NOW IN MAIN POSITION

S16～S18 MODE (L+R—L—R—STEREO—REVERCE)
NOW IN L+R POSITION

S19～20 POWER SOURCE SELECT SWITCH
(110V / 120V / 220V / 240V)
NOW IN 110V POSITION

S21 POWER SOURCE SWITCH
NOW IN OFF POSITION

▨ : Wire Wound Resistor

◎ : Ceramic Capacitor

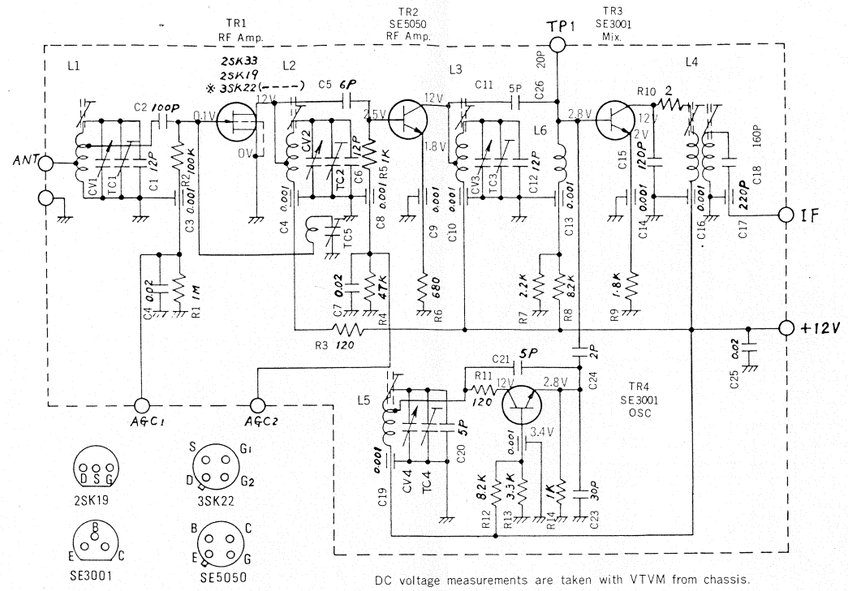
Ⓜ : Polyestor Film Capacitor

SCHEMATIC DIAGRAM and CIRCUIT BOARD

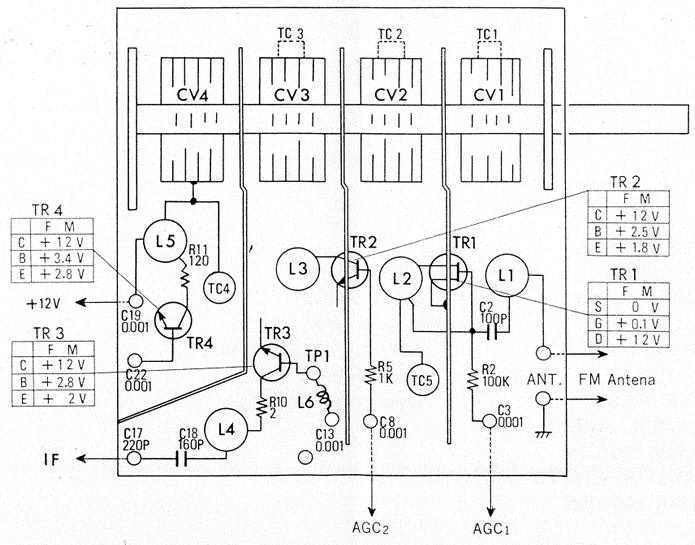
MODEL **SA-65**

FM FRONT END

UKW ABSTIMMEINHEIT



DC voltage measurements are taken with VTVM from chassis.
Voltage only FM position.



TR4	F	M
C	+ 12 V	
B	+ 3.4 V	
E	+ 2.8 V	

TR3	F	M
C	+ 12 V	
B	+ 2.8 V	
E	+ 2 V	

TR2	F	M
C	+ 12 V	
B	+ 2.5 V	
E	+ 1.8 V	

TR1	F	M
S	0 V	
G	+ 0.1 V	
D	+ 12 V	

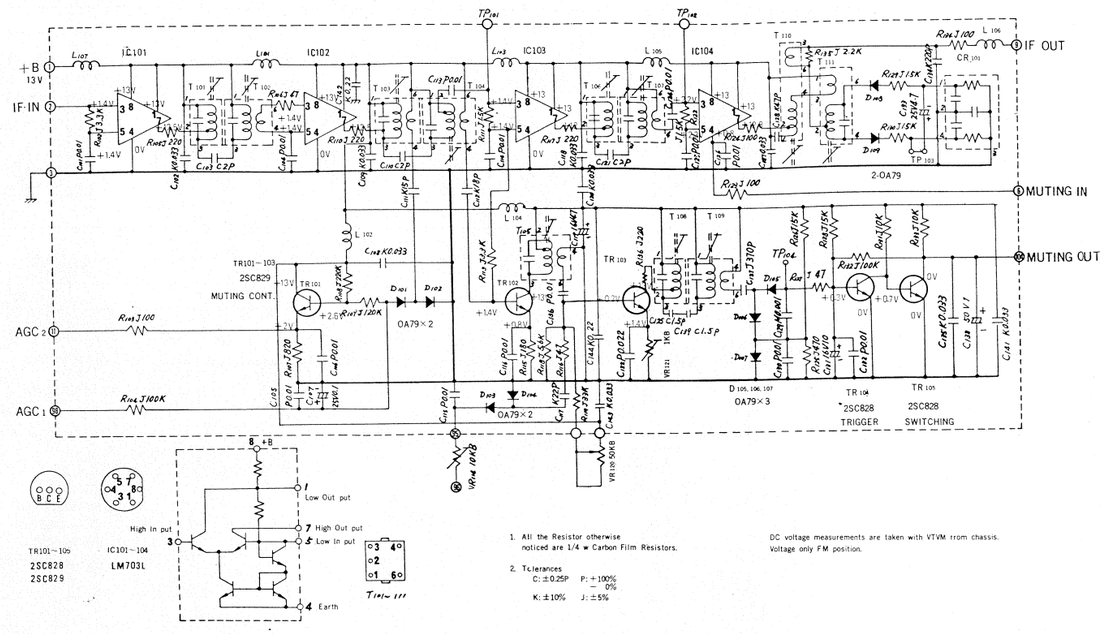
TR	TR4	TR3	TR2	TR1
L	L5	L4	L3 L6	L2 L1

FM IF & MUTING

ZF UND DÄMPFUNG

⊕ LINE

EARTH LINE



1. All the Resistor otherwise noticed are 1/4 w Carbon Film Resistors.
2. Tolerances
   C: ±0.25P P: +100% −0%
   K: ±10% J: ±5%

DC voltage measurements are taken with VTVM rrom chassis.
Voltage only FM position.

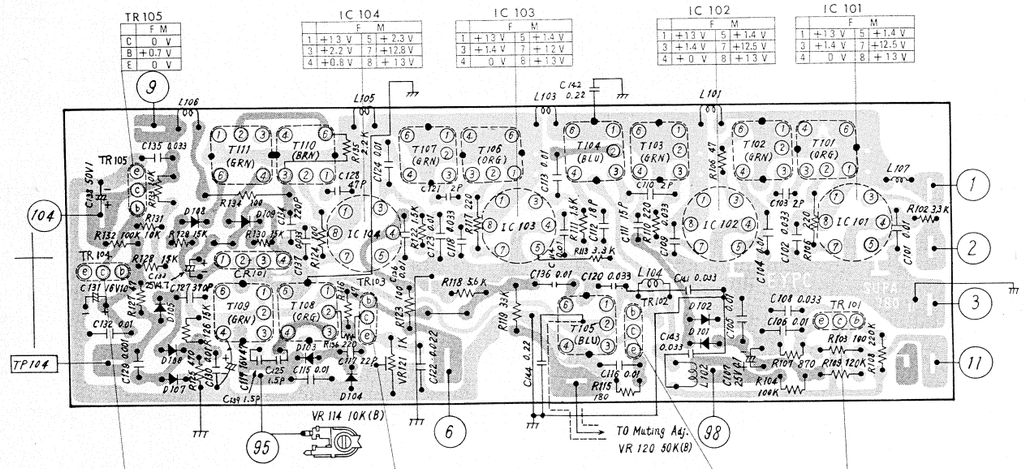
TR105	F	M
C	0 V	
B	+0.7 V	
E	0 V	

IC 104	F	M
1	+1.3 V	
3	+2.2 V	
4	+0.8 V	
5	+2.3 V	
7	+12.8 V	
8	+13 V	

IC 103	F	M
1	+1.3 V	
3	+1.4 V	
4	0 V	
5	+1.4 V	
7	+1.2 V	
8	+13 V	

IC 102	F	M
1	+1.3 V	
3	+1.4 V	
4	+ 0 V	
5	+1.4 V	
7	+12.5 V	
8	+13 V	

IC 101	F	M
1	+1.3 V	
3	+1.4 V	
4	0 V	
5	+1.4 V	
7	+12.5 V	
8	+13 V	



TR & L	TR104	TR105	L106	L105	TR103	L103	TR102	L104	L102	L101	TR101	L107
T	T109	T111	T108	T110	T107	T106	T105	T104	T103	T102	T101	
IC & D	D105	D106	D107	D108	D109	D103	IC104	D104	IC103	D101	D102	IC101	IC101

TR104	F	M
C	+ 0.7 V	
B	+ 0.3 V	
E	0 V	

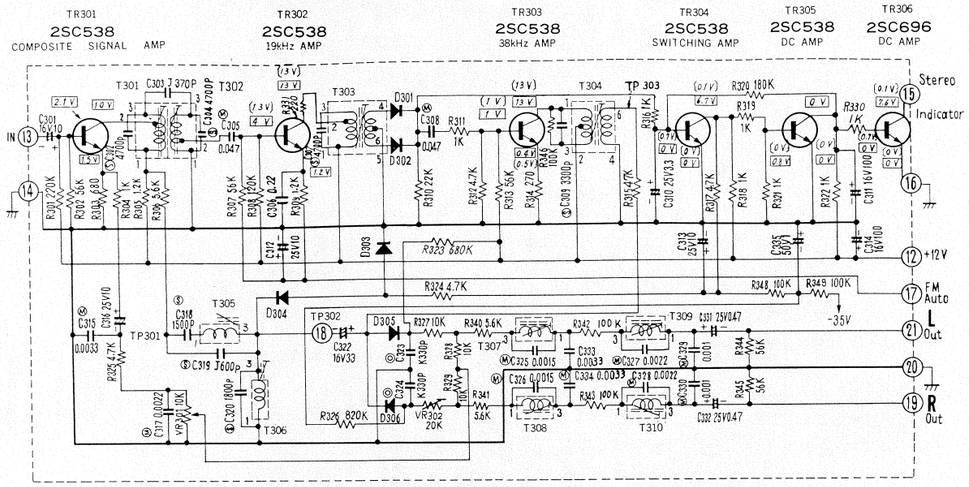
TR103	F	M
C	+ 13 V	
B	+ 0.2 V	
E	+ 1.4 V	

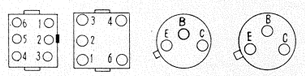
TR102	F	M
C	+ 13 V	
B	+ 1.4 V	
E	+ 0.8 V	

TR101	F	M
C	+ 13 V	
B	+ 2.6 V	
E	+ 2 V	

SCHEMATIC DIAGRAM and CIRCUIT BOARD MODEL SA-65

MPX **MULTIPLEX**





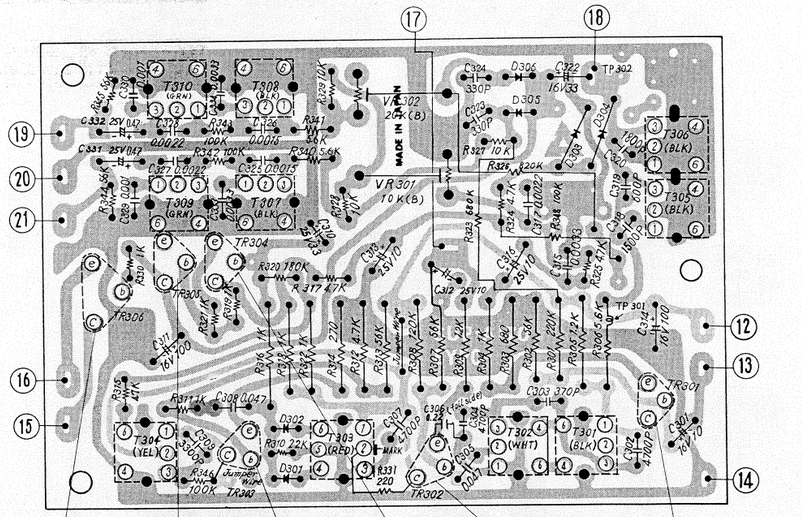
D301, 302, 305, 306. 2—OA79

D303. 304 MA26

Ⓢ Polystyrene Capacitor
Ⓜ Polyster Film Capacitor
Ⓒ Ceramic Capacitor

Tolerances
J : ± 5%
P : + 100% − 0 %

DC voltage measurements are taken with VTVM from chassis.
□ ·····FM Position
( ) ·····FM Stereo Position



TR	D	TR306	305	304	TR303	D302	D301	TR302	D305	D306	D303	D304	TR301
T		T304	T309	T310	T307	T308	T303	T302	T302		T301		T306	T305

TR306

	FM	FM ST
C	7.6 V	0.1 V
B	0 V	0.7 V
E	0 V	0 V

TR305

	FM	FM ST
C	0 V	7 V
B	0.8 V	0 V
E	0 V	0 V

TR303

	FM	FM ST
C	13 V	13 V
B	1 V	1 V
E	0.4 V	0.5 V

TR304

	FM	FM ST
C	6.7 V	0.1 V
B	0 V	0.7 V
E	0 V	0 V

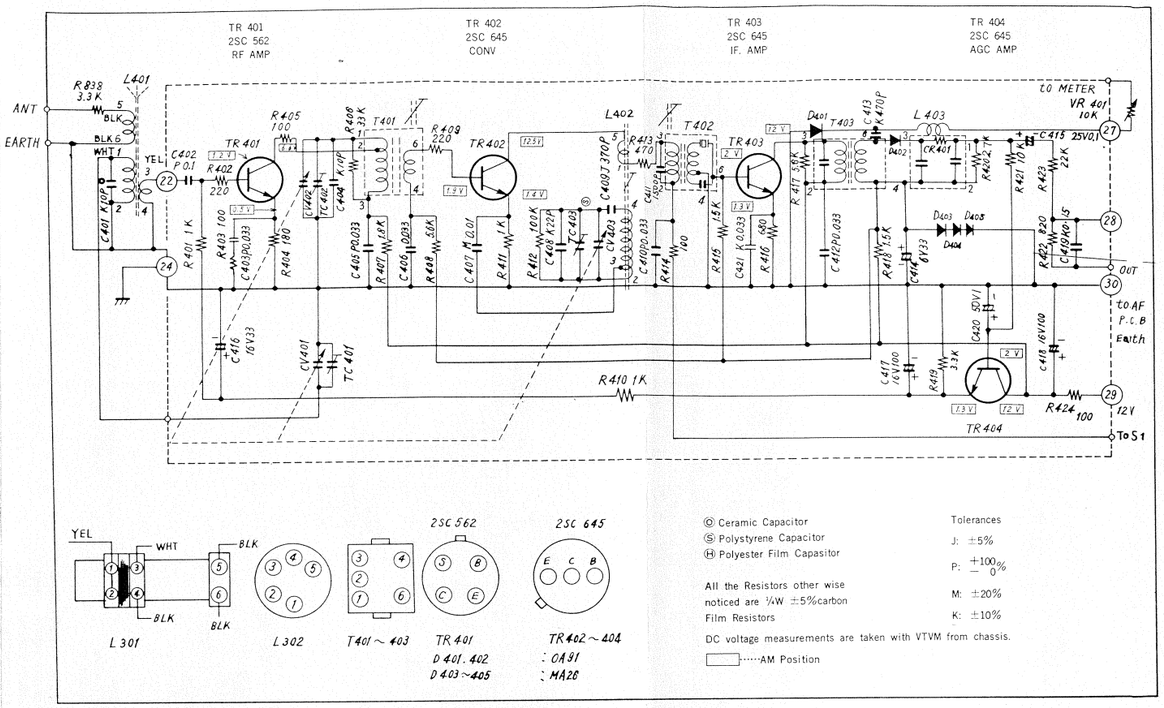
TR302

	FM	FM ST
C	13 V	13 V
B	4 V	1.3 V
E	1.2 V	0.7 V

TR301

	FM	FM ST
C	10 V	10 V
B	2.1 V	2.1 V
E	1.5 V	1.5 V

AM **AM**



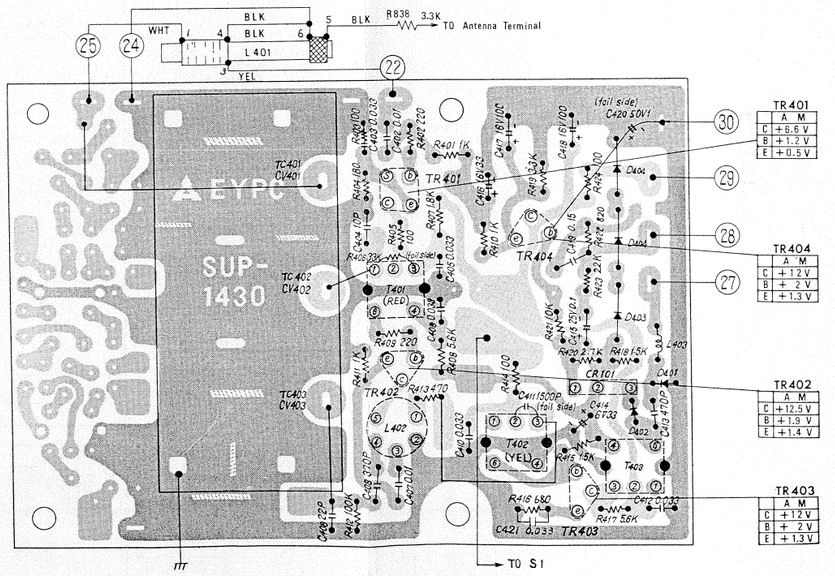
Ⓒ Ceramic Capacitor
Ⓢ Polystyrene Capacitor
Ⓗ Polyester Film Capasitor

All the Resistors other wise noticed are ¼W ±5%carbon Film Resistors

DC voltage measurements are taken with VTVM from chassis.

□·····AM Position

Tolerances
J: ±5%
P: +100% −0
M: ±20%
K: ±10%



TR401

	A	M
C	+6.6 V	
B	+1.2 V	
E	+0.5 V	

TR404

	A	M
C	+12 V	
B	+2 V	
E	+1.3 V	

TR402

	A	M
C	+12.5 V	
B	+1.9 V	
E	+1.4 V	

TR403

	A	M
C	+12 V	
B	+2 V	
E	+1.3 V	

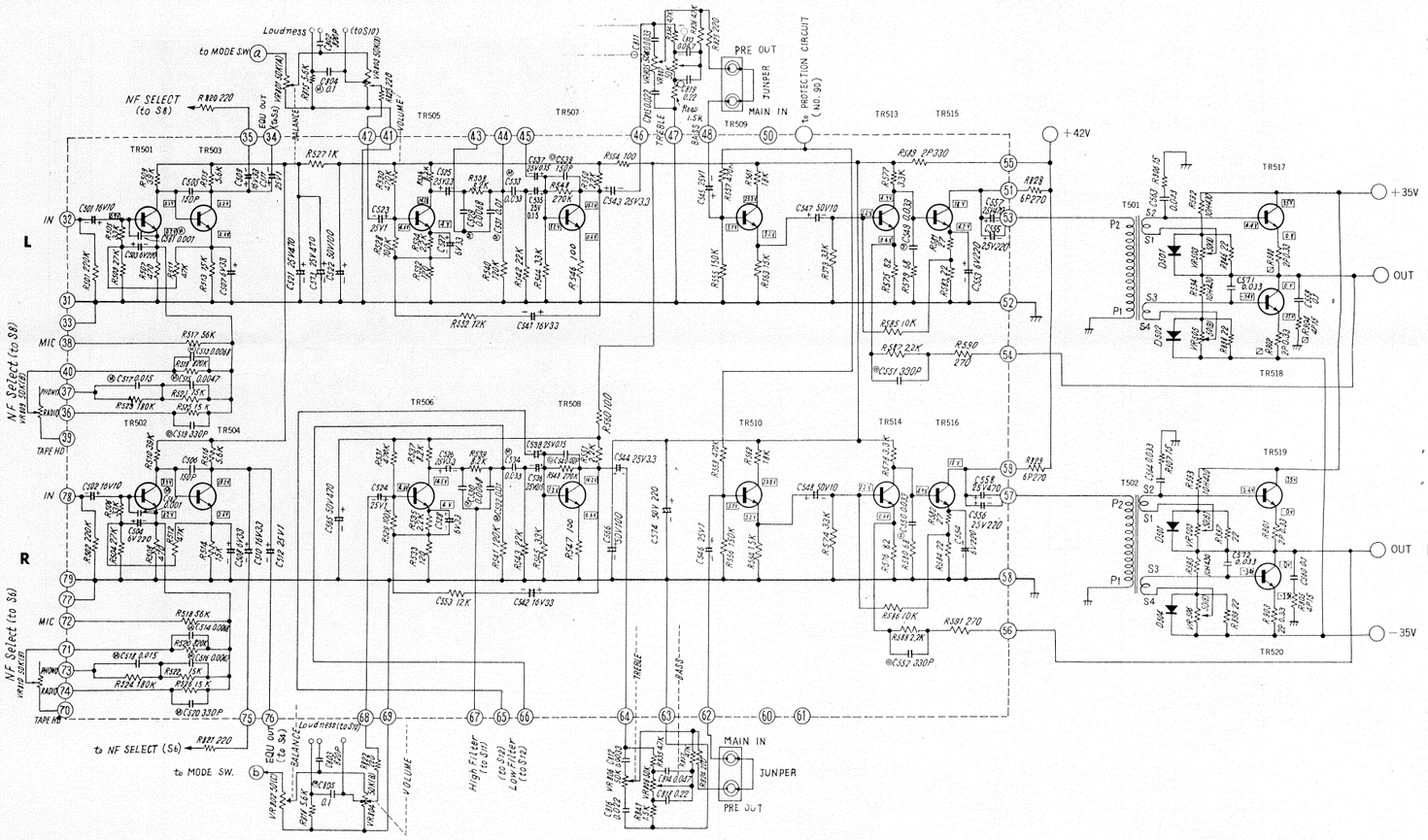
TR	L	L401	L402	TR401	TR402	TR404	TR403	L403
T	D	T401			T402	D5 D4 D3	T403	D2 D1

EQUALIZER, CONTROL & MAIN AMP

ENTZERRER, KONTROLLE UND HAUPTVERSTÄRKER

SCHEMATIC DIAGRAM and CIRCUIT BOARD

MODEL SA-65



TR501~510	TR513, 514
2SC644	2SC538
TR515, 516	TR517~520
2SC697	2SD218
D501~504	
FR1M	

Bottom View / Top View

2SC538 (E C B) 2SC697 (E B C) 2SD218 (B E C) T501, 502 (S1 P2 P1 / S2 S3 S4, Bottom View Red Mark) 2SC644 (B C E)

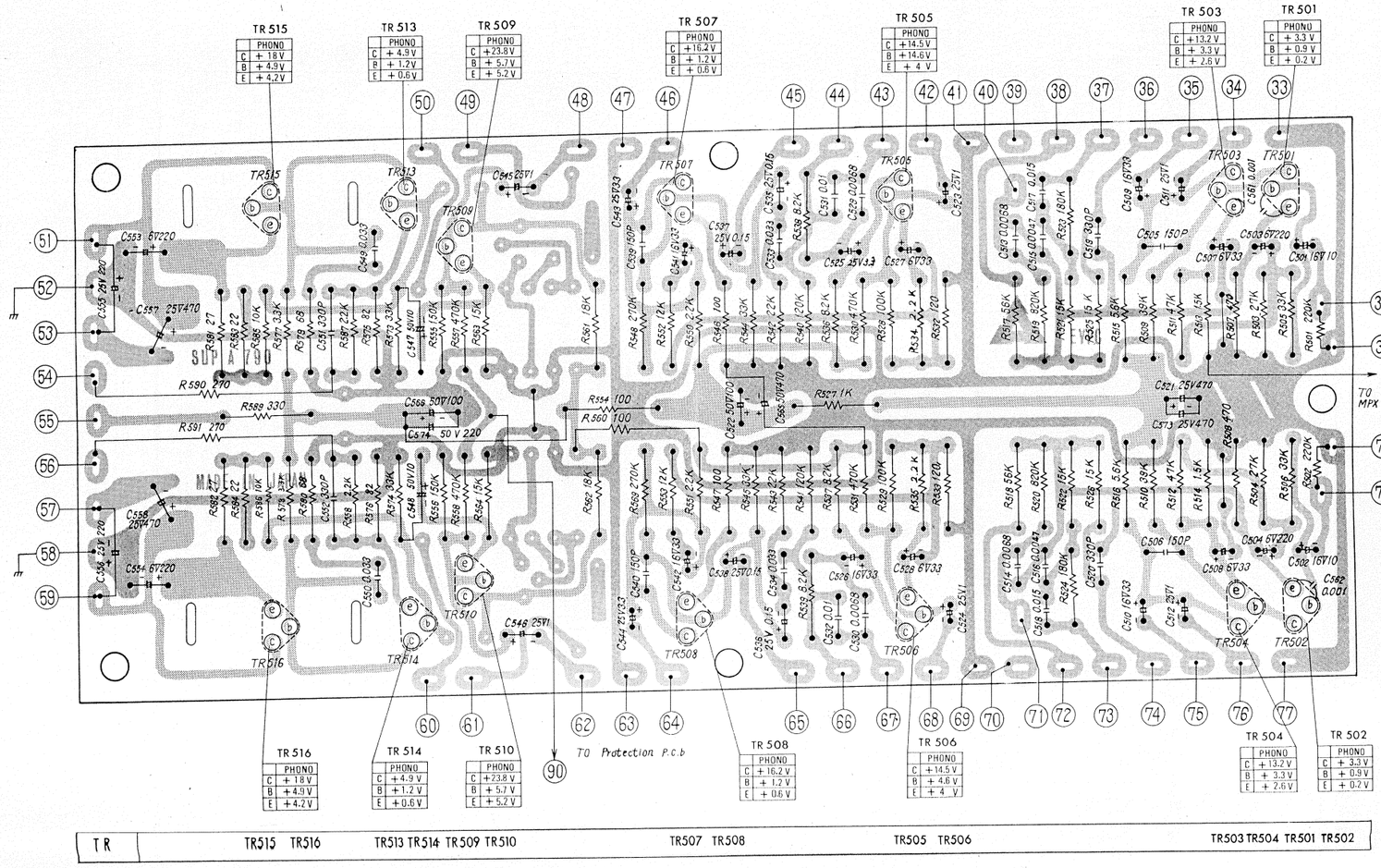
- ◎ Ceramic Capacitor
- Ⓜ Polyestor Film CapaCitor
- ▨ Wire Wound Resistor

DC voltage measurements are taken with VTVM from chassis.
[ ] ····· PHONO Position

VR 801, 802	BALANCE CONTROL	(Gang)
VR 803, 804	VOLUME CONTROL	(Gang)
VR 805, 806	TREBLE CONTROL	(Double)
VR 807, 808	BASS CONTROL	(Double)

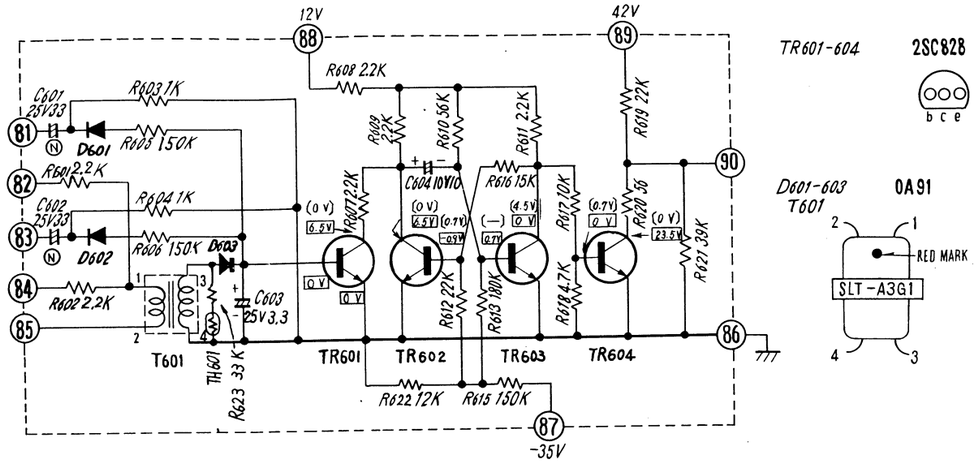
⊕ LINE

EARTH LINE


TR 515 PHONO C +1.8 V B +4.9 V E +4.2 V
TR 513 PHONO C +4.9 V B +1.2 V E +0.6 V
TR 509 PHONO C +23.8 V B +5.7 V E +5.2 V
TR 507 PHONO C +16.2 V B +1.2 V E +0.6 V
TR 505 PHONO C +14.5 V B +14.6 V E +4 V
TR 503 PHONO C +13.2 V B +3.3 V E +2.6 V
TR 501 PHONO C +3.3 V B +0.9 V E +0.2 V
TR 516 PHONO C +1.8 V B +4.9 V E +4.2 V
TR 514 PHONO C +4.9 V B +1.2 V E +0.6 V
TR 510 PHONO C +23.8 V B +5.7 V E +5.2 V
TR 508 PHONO C +16.2 V B +1.2 V E +0.6 V
TR 506 PHONO C +14.5 V B +4.6 V E +4 V
TR 504 PHONO C +13.2 V B +3.3 V E +2.6 V
TR 502 PHONO C +3.3 V B +0.9 V E +0.2 V
TO MPX P.C.b
TO Protection P.c.b
TR | TR515 TR516 | TR513 TR514 TR509 TR510 | TR507 TR508 | TR505 TR506 | TR503 TR504 TR501 TR502

SCHEMATIC DIAGRAM and CIRCUIT BOARD MODEL SA-65

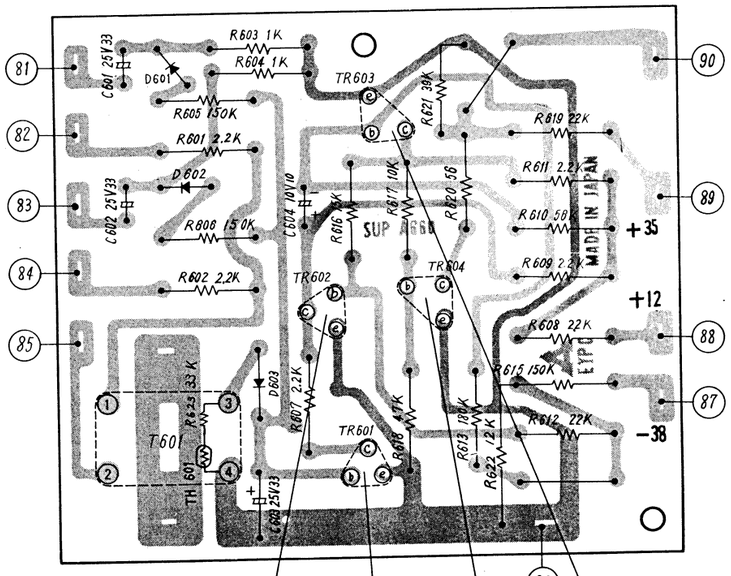
PROTECTION SCHUTZ



TR601-604 2SC828

D601-603 0A91
T601

DC voltage measurements are taken with VTVM from chassis.
[ ]·····No Movement Position
( )·····Speaker Terminal to Short Position



TR / T	T601	TR602	TR601	TR603	TR604
D	D601 D602 D603				

TR602

	NO MOV.	SHORT
C	+ 6.5 V	0 V
B	− 0.9 V	+ 0.7 V
E	0 V	0 V

TR601

	NO MOV.	SHORT
C	+ 6.5 V	0 V
B	0 V	0 V
E	0 V	0 V

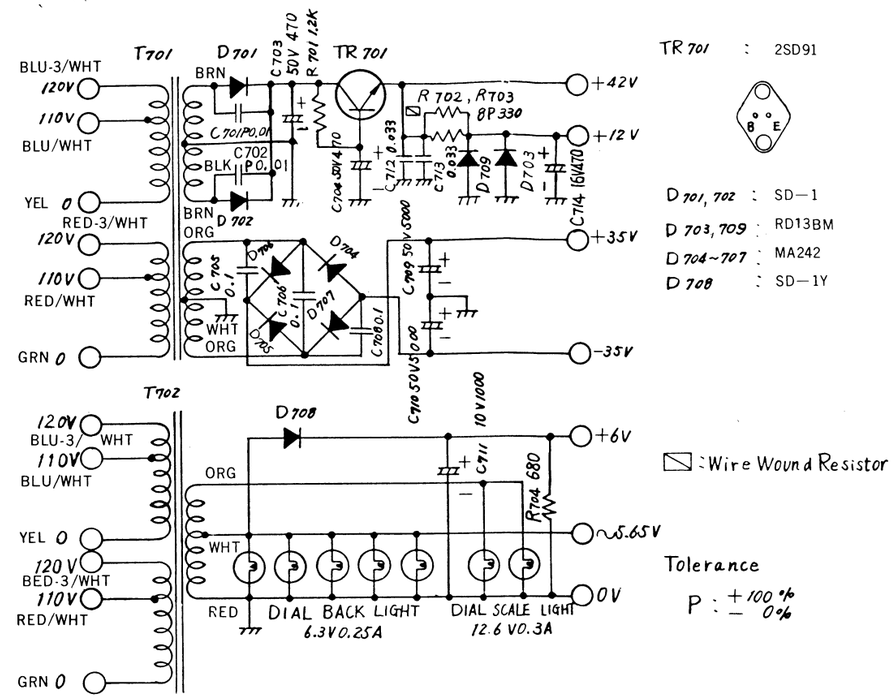
TR604

	NO MOV.	SHORT
C	+ 23.5 V	0 V
B	0 V	+ 0.7 V
E	0 V	0 V

TR603

	NO MOV.	SHORT
C	0 V	+ 4.5 V
B	+ 0.7 V	V
E	0 V	0 V

POWER SUPPLY STROMVERSORGUNG



TR701 : 2SD91

D701, 702 : SD−1
D703, 709 : RD13BM
D704~707 : MA242
D708 : SD−1Y

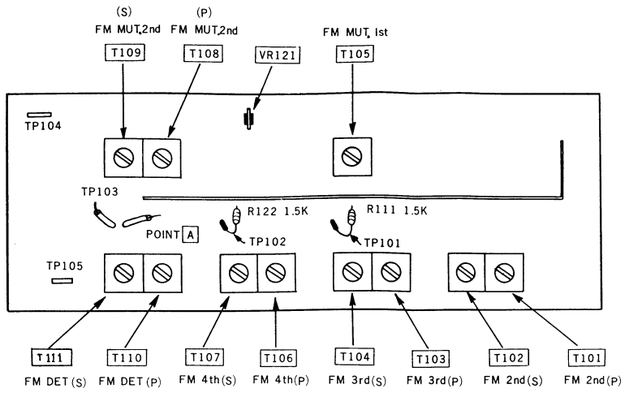
▨ : Wire Wound Resistor

Tolerance
P : ± 100 %
− 0 %

—MEMO— —NOTIZEN—

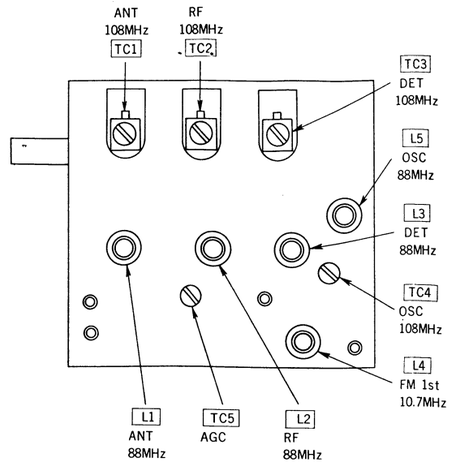
■ ALIGNMENT POINTS

■ ABGLEICHPUNKTE



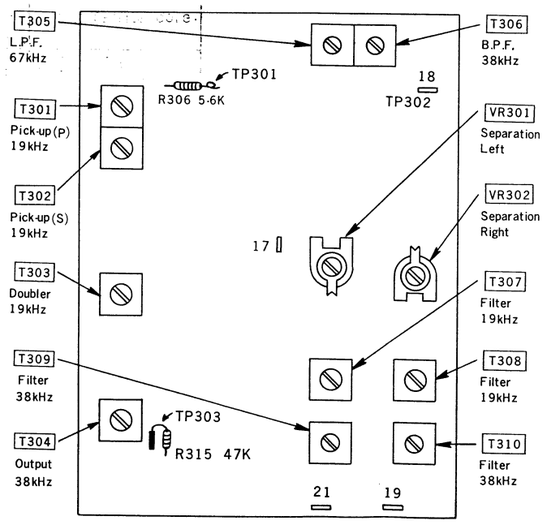
FM-IF & MUTING P.C.B.

ZF UND DÄMPFUNG



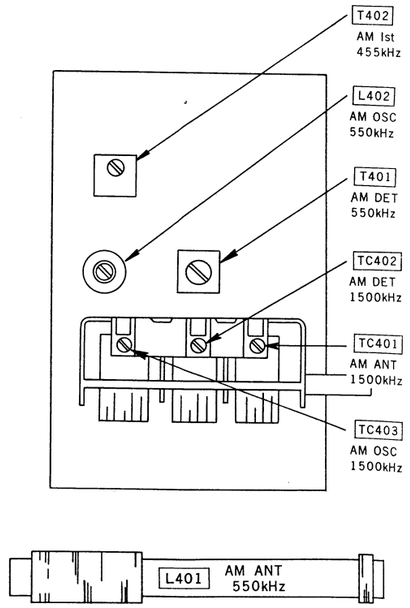
FM FRONT END

UKW ABSTIMMEINHEIT



MPX P.C.B.

MULTIPLEX


T402 AM 1st 455kHz
L402 AM OSC 550kHz
T401 AM DET 550kHz
TC402 AM DET 1500kHz
TC401 AM ANT 1500kHz
TC403 AM OSC 1500kHz
L401 AM ANT 550kHz

AM-RF & IF P.C.B.

AM-HF UND ZF

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Notes :
1. Band selector switch——Aux.
2. Speaker switch——Main
3. Volume control——Minimum
4. Bass and treble controls——Center
5. Maintain line voltage at rated voltage.
6. Other controls at optional positions.
7. DC VTVM (30 or 100mV full scale)

	VTVM CONNECTION	ADJUSTMENT	REMARKS
	ICQ ALIGNMENT		
1	Connect to R900 Ⓐ point (VR503 Ⓘ terminal) and R902 Ⓑ point (VR505 Ⓘ terminal). Common to Ⓒ point (H46 terminal) and Ⓓ point (H45 terminal). (Refer to fig. 1)	VR503 and VR505 (Left Channel)	Make adjustments so that the indication on VTVM becomes 10mV.
2	Connect to R901 Ⓐ point (VR504 Ⓘ terminal) and R903 Ⓑ point (VR506 Ⓘ terminal). Common to Ⓒ point (H47 terminal) and Ⓓ point (H48 terminal). Refer to fig. 1.	VR504 and VR506 (Right channel)	
	OUTPUT DC UNBALANCE ALIGNMENT		
3	VTVM across main-speaker terminal.	VR503 or VR505 VR504 or VR506	Make sure that VTVM becomes OV.

Notes :
1. Band selector switch——AM or FM-Mono
2. Speaker switch——Main
3. Volume Control——Maximum (AM, FM-RF), Minimum (FM-IF)
4. Bass and treble control——Center
5. Balance control——Center
6. Tape monitor Switch——Source
7. Output signal generator should be no higher than necessary to abtain an output reading.
8. Loudness switch——Off
9. Mode switch——Stereo
10. High and low filter switch——Off
11. Muting switch——Off
12. Maintain line voltage at rated voltage.

	SIGNAL GENERATOR or SWEEP GENERATOR		RECEIVER DIAL SETTING (DISTANCE)	INDICATOR (VTVM or SCOPE)	ADJUSTMENT	REMARKS
	CONNECTION	FREQUENCY				
	AM ALIGNMENT					
4	Fashion loop of several turns of wire and radiate signal into loop of receiver.	455 kHz. 30% Mod. with 1000Hz	Point of noninterference. (on/about 600kHz)	Output meter across main-speaker terminal. (L and R ch.)	T402 (AM 1st IFT)	Adjust for maximum output. Keep IF tolerance within 455KHz ±5KHz.
5	〃	550 kHz 30% Mod. with 400Hz	550 kHz. (17.7mm)	〃	L402 (AM OSC Coil) T401 (AM DET Coil) L401 (AM ANT Coil) *	Adjust for maximum output. adjust L401 by moving coil bobbin along ferrite core.
6	〃	1500kHz 30% Mod. with 400Hz	1500kHz (148.9mm)	〃	TC403(AM OSC Trimmer) TC402(AM DET Trimmer) TC401(AM ANT Trimmer)	Adjust for maximum output. Repeat steps (5)and(6).
	AM METER ALIGNMENT					
7	〃	1000kHz 94dB/m	1000kHz	Tuning meter of set.	VR401	Adjust for maximum swing.

* Cement antenna bobbin with wax after completing alignment.

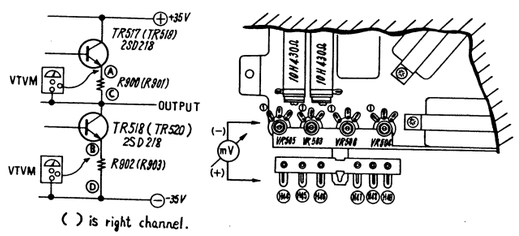


Fig. 1

	SIGNAL GENERATOR or SWEEP GENERATOR CONNECTION	SIGNAL GENERATOR or SWEEP GENERATOR FREQUENCY	RECEIVER DIAL SETTING	INDICATOR (VTVM or SCOPE)	ADJUSTMENT	REMARKS
	FM — IF ALIGNMENT					
8	High side through 0.001mfd to test point **TP**1.	10.7 MHz (400kHz Sweep)	Point of noninterference (on/about 90MHz)	Connect vert. amp. of scope through detector to test point **TP**101. (Refer to fig. 2)	T101 (FM 2nd IFT)(P) T102 (FM 2nd IFT)(S) T103 (FM 3rd IFT)(P) T104 (FM 3rd IFT)(S) L4(FM 1st IFT) (P)(S) (Refer to fig. 3)	Adjust for maximum amplitude and proper linearity between ±100kHz markers. (Refer to fig. 4)
9	〃	〃	〃	Connect vert. amp. of scope through detector to test point **TP**102.	T106 (FM 4th IFT)(P) T107 (FM 4th IFT)(S)	〃
10	〃	〃	〃	Connect vert. amp. of scope to test point **TP**103. *	T110 (FM DET IFT)(P)	〃
	* Unsolder lead between test point **TP**103 and point [A] befor alignment, and resolder it after alignment.					
	FM—IF (S CURVE) ALIGNMENT					
11	High side through 0.001mfd to test point **TP** 1.	10.7 MHz (400kHz Sweep)	Point of noninterference (on/about 90MHz)	Connect vert. amp. of scope to test point **TP**105.	T111 (FM DET IFT)(S)	Adjust **T**111 so that 10.7MHz marker appears at the center. (Refer to fig. 5)
12	〃	〃	〃	Connect VTVM to **TP**105. Common to chassis.	T111 (FM DET IFT)(S)	Make sure that VTVM become OV.
	FM—IF (MUTING) ALIGNMENT					
13	〃	〃	〃	Connect vert. amp. of scope to **TP**104.	T105 (FM MUT. 1st IFT) T108(FM MUT. 2nd IFT) (P) T109(FM MUT. 2nd IFT)(S)	Adjust for maximum amplitude and symmetrical curve.
	FM METER ALIGNMENT					
14	Connect to FM antenna terminal through FM dummy antenna.	98MHz 30% Mod, with 400Hz 106dB	98MHz	Tuning meter of set.	VR114	Adjust for maximum swing
	MUTING LEVEL ALIGNMENT					
	Note : Muting switch——ON					
15	〃	90 MHz (〃) 22dB	90MHz	VTVM across speaker terminal	VR121	Adjust for minimum output.
	FM STEREO ALIGNMENT					

Notes : Stereo-modulator——Connect stereo-modulator output to EXT. MOD. terminal of signal generator. Inter OSC 1kHz. Pilot signal modulation 10%.
Signal genarator—— Frequency approxinately 98MHz. Output level 20~40dB. Modulation mode FM.
Andio oscillator—— Effective to 0~100kHz.

1. Band selector switch——FM-Auto
2. Speaker switch——Main
3. Volume control——Adj. IV output(Separation)
4. Bass and treble control——Center
5. Mode switch——Stereo
6. Loudness switch——Off
7. High and low filter——ON
8. Muting switch——Off
9. Maintain line voltage at rated voltage.
10. Dummy load——8Ω, L and R Main terminal

Band Pass and Trap Coil Alignment

	AF OSCILLATOR CONNECTION(FREQUENCY)	INDICATOR (VTVM or SCOPE)	ADJUSTMENT	REMARKS
16	Connect to **TP**301 through 22kΩ of MPX p.c.b. (38kHz)	Connect scope to No. 18 terminal (**TP**302)of MPX p.c.b.	T306(38kHz Band Pass Filter)	Adjust for maximum scope pattern.
17	〃 (67kHz)	〃	T305(67kHz Low Pass Filter)	Adjust for minimum scope pattern. Repeat steps(16) and(17).

19kHz, 38kHz Amplifier and Phase Alignment

Note : No. 17 terminal of MPX p.c.b. connect to chassis with lead.

	SIGNAL GENERATOR CONNECTION	STEREO MODULATOR MODE and MOD. RATE	INDICATOR (VTVM or SCOPE)	ADJUSTMENT	REMARKS
18	FM antenna terminal through dummy antenna.	Pilot 10%	Connect scope to **TP**303 of MPX p.c.b.	T301(19kHz pick-up Coil)(P) T302(19kHz pick-up Coil)(S) T303(19kHz Doubler Coil) T304(38kHz Output Coil)	Adjust for maximum scope pattern.
19	〃	L-R 100%	〃	T302(19kHz Pick-up Coil)(S)	Adjust for small wave of C section, and big wave of B section. Refer to fig. 6.
	Leak Carrier Filter Alignment				
20	〃	Pilot 10%	Connect scope to MPX p.c.b. No. 19 and 21 terminal, Common to chassis.	T308 and T307 (Leak Carrier Filter) T310 and T309 (Leak Carrier Filter)	Adjust for minimum scope pattern.
	Separation Alignment				
21	〃	L (or R) 30%	Output meter across speaker terminal thrugh low pass filter.	VR301(Left side) VR302(Right side)	Adjust for minimum Right (or Left) side output.
	TAPE EQUALIZER ADJUSTMENT ALIGNMENT				

Notes : 1. Band selector switch——Tape Head
2. Volume control——Minimum
3. Mode switch——Stereo (Normal)
4. Tape equalizer adj. volume is set rear panel view.

	AF OSCILLATOR CONNECTION	FREQUENCY	VTVM CONNECTION	ADJUSTMENT	REMARKS
22	Connect to "tape-head" terminal. (L and R side)	1kHz	Connect to"rec. out" terminal.(L and R side)	Input level of set.	Adjust for 0dB with 0.1V range of vacuum tube voltmeter.
23	〃	10kHz	〃	VR809(Left side) VR810(Right side)	Adjust for -10dB. Repeat steps(22)and (23)

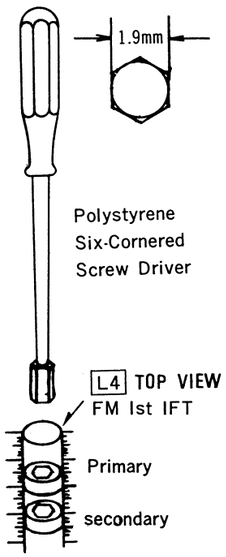


Fig. 3

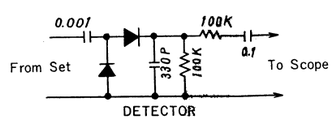


Fig. 2

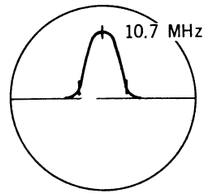


Fig. 4

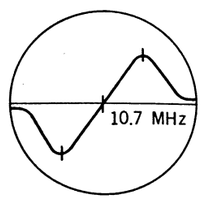


Fig. 5

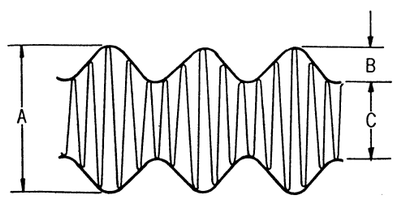


Fig. 6

FM—RF ALIGNMENT

Note : Don't except necessary.

	SIGNAL GENERATOR or SWEEP GENERATOR		RECEIVER DIAL SETTING (DISTANCE)	INDICATOR (VTVM and SCOPE)	ADJUSTMENT	REMARKS
	CONNECTION	FREQUENCY				
1	Connect to FM antenna terminal through FM dummy antenna, Common to chassis.	88 MHz 30%Mod. with 400Hz	88MHz (8.7mm)	Connect VTVM and scope to poit TP103	L5 (OSC Coil)	Adjust for maximum output.
2	〃	108 MHz 〃	108 MHz (153. 7mm)	〃	TC4 (OSC Trimmer)	〃 Repeat steps(1) and(2).
3	〃	88 MHz 30% Mod. with 400Hz	88 MHz	〃	L1(ANT Coil) L2(RF Coil) L3(DET Coil)	Adjust for maximum output.
4	〃	108 MHz 〃	108 MHz	〃	TC1 (ANT Trimmer) TC2 (RF Trimmer) TC3 (DET Trimmer)	〃 Repeat steps(3) and(4).

■ DIAL CORD INSTALLATION GUIDE

1. Dial cord length is 300 cm (118-1/8").
2. Tuning gang is positioned at maximum capacity.
3. Arrow marks (1–9) and (1–6) indicate correct order and direction of stringing dial cord.
4. Cement dial cord ends.

■ ANWEISUNG FÜR DAS AUFLEGEN DES SKALANSEILES

1. Skalenseil-Lange 300 cm.
2. Drehkondensator voll zugedreht.
3. Die Pfeile (1–9) und (1–6) zeigen den korrekten Verlauf des Skalenseiles.
4. Enden des Skalenseiles sichern.

■ TO MOUNT DIAL POINTER

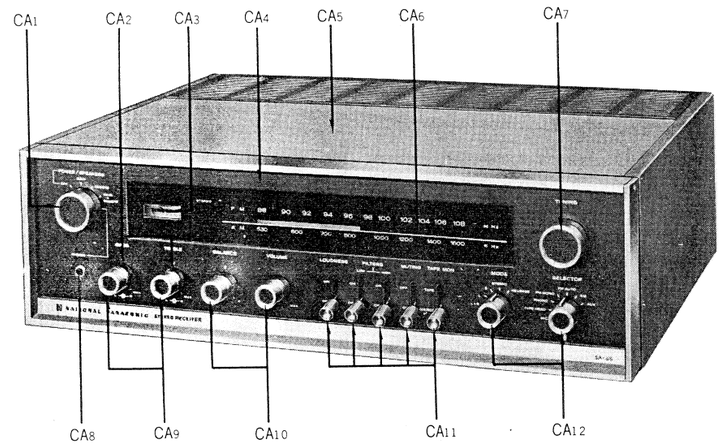
1. Set tuning gang fully closed position.
2. Set dial pointer to start point of dial scale.
3. Attach dial cord to dial pointer.

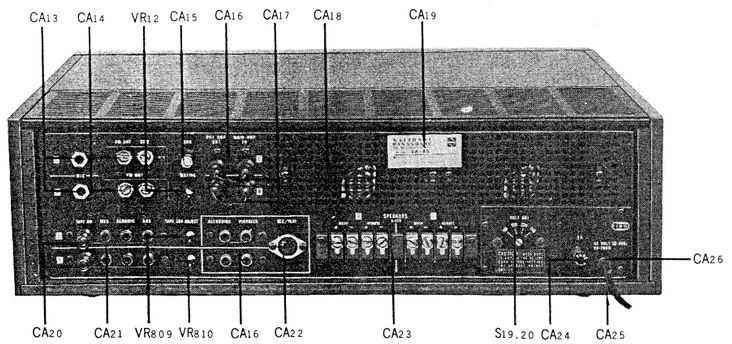
■ ANBRINGEN DES SKALENZEIGERS

1. Drehkondensator voll zugedreht.
2. Skalenzeiger auf den Anfangspunkt der Skala bringen.
3. Skalenseil am Skalenzeiger befestigen.

■ CABINET PARTS LOCATION

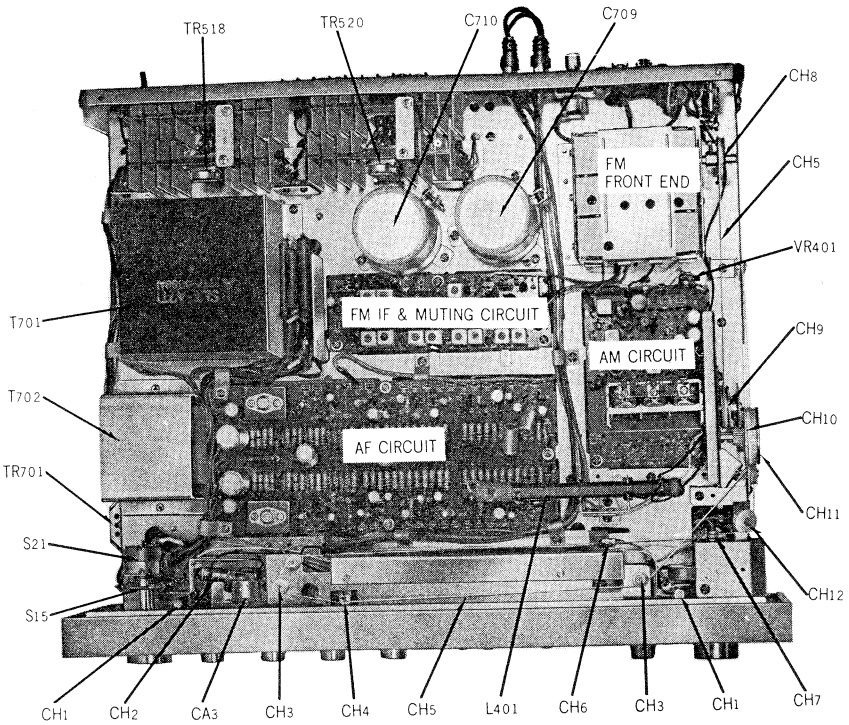
■ ANORDNUNG DER TEILE AM GEHÄUSE

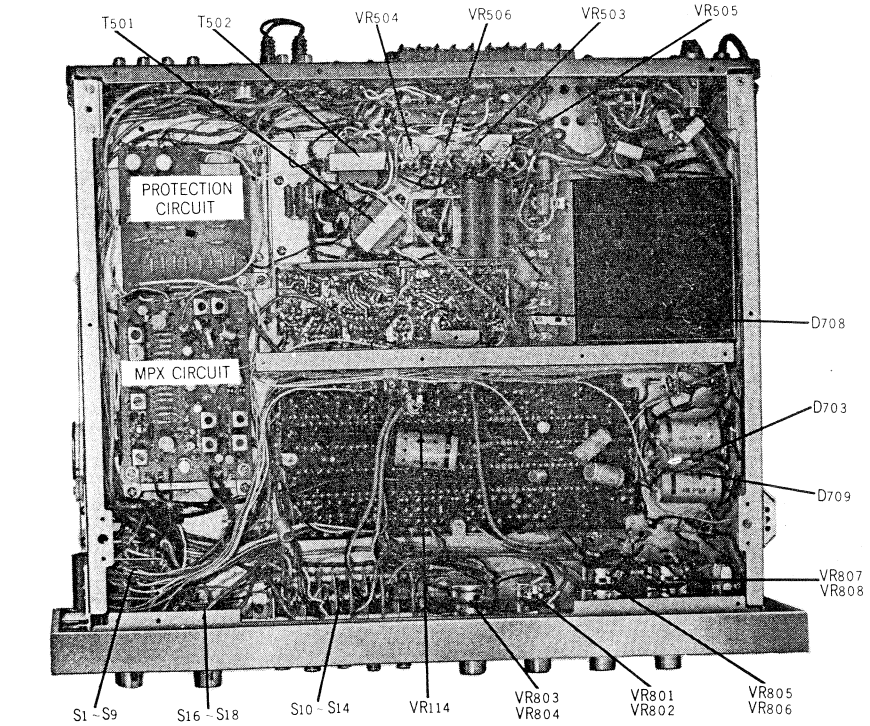




■ CHASSIS PARTS LOCATION

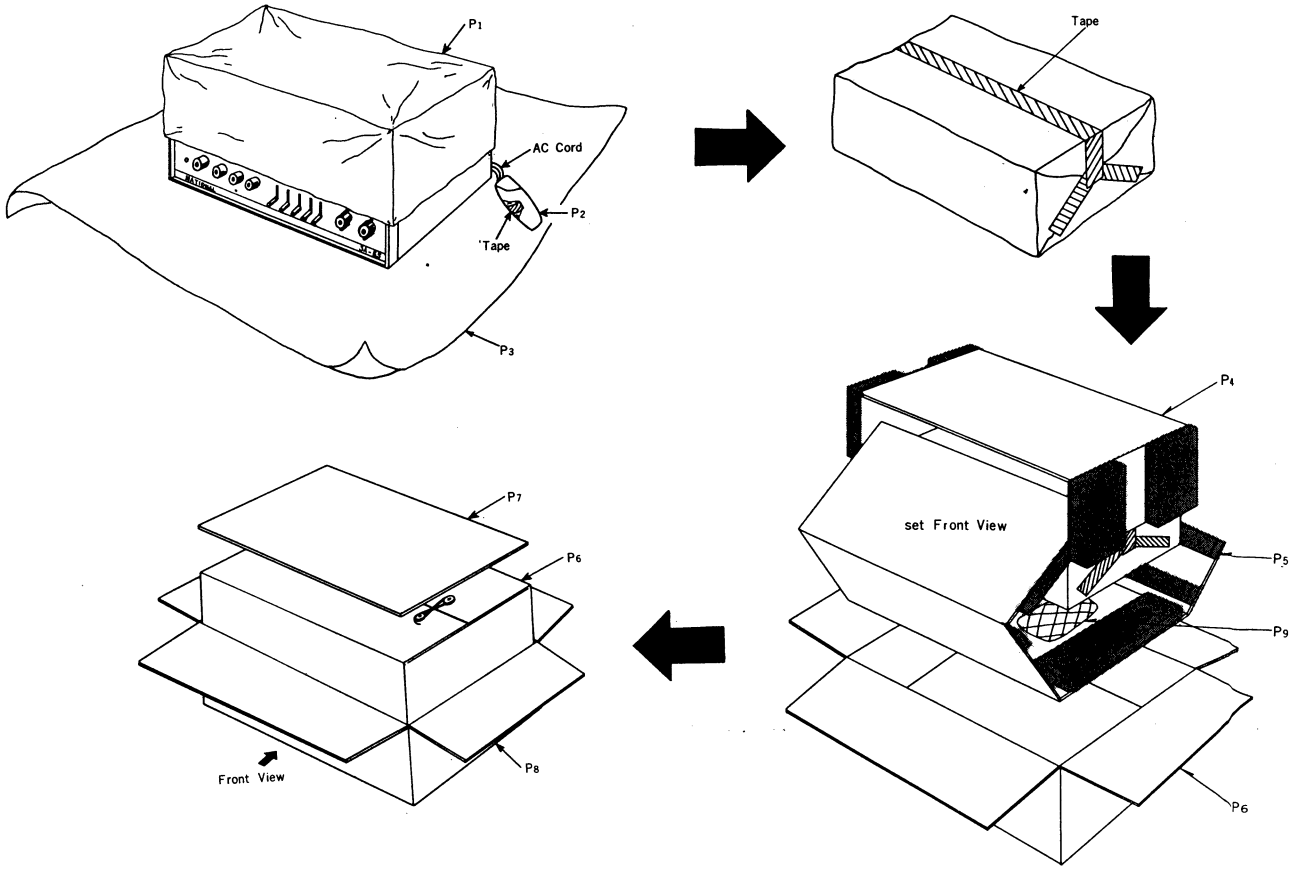
■ ANORDNUNG DER TEILE AM CHASSIS





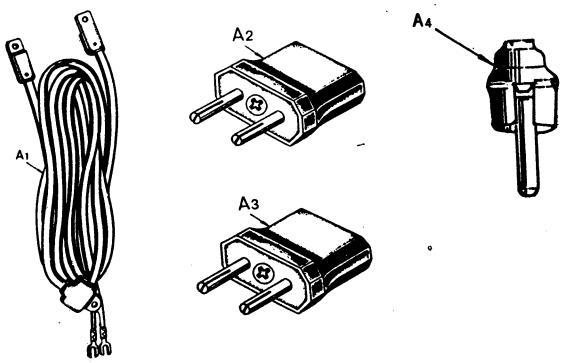
■ PACKING PARTS LOCATION

■ PACKANORDUNG



■ ACCESSORIES

■ ZUBEHÖR



REPLACEMENT PARTS LIST
STEREO MODEL SA-65

LISTE DER ERSATZTEILE
STEREO MODELL SA-65

NOTES: 1. Part numbers are indicated on most mechanical parts.
Please use this number, for parts which have no Ref. No.
2. ISO metric thread screws & parts which employ ISO metric thread screws are indentified by ISO marking (ISO)
3. Ⓝ indicates the New Parts.
4. **A**–**C** rank. **A** rank parts will cover 80% of repair needs.
A+**B** rank parts will cover 95% of repair needs.
C rank parts are less necessary.
5. ( ) Part No. is old part No.
6. Please use the "Price" column as desired.
7. These parts are illustrated on prior pages according to their reference numbers.

BEMERKUNGEN:
1. Ersatzteilnummern sind auf den meisten mechanischen Teilen angegeben. Bitte benutzen Sie diese Nummer für Teile, die keine Ref. No. haben.
2. ISOmetrische Gewindeschrauben und Teile, die ISO metrische Gewindeschrauben verwenden, sind durch ISO (ISO) markiert.
3. Ⓝ bezeichnet Neue Teile.
4. **A**–**C** Rangordnung:
A Teile decken 80% des Reparaturbedarfs.
A+**B** Teile decken 95% des Reparaturbedarfs.
C Teil werden nur selten benutzt.
5. ( ) Teil Nummer ist die alte Teil Nummer.
6. Bitte benutzen Sie die "Preis"-Spalte nach Wunsch.
7. Diese Teile sind auf der verhergehenden Seite entsprechend ihren Bezugsnummern abgebildet.

SA-65

ezugs Nr. / Ref. No.	Teil Nr. / Part No.	Bezeichnung / Description	Stückzahl Pro Gerat / Per Set (Pcs.)	Bemerkung / Remarks	Preise / Price	
	SXTAI	FM Front End Tuner Pack	1	Ⓝ **A**		

UKW ABSTIMMEINHEIT
FRONT END

TRANSISTOREN und ICS
TRANSISTORS & ICS

TR101~103	2SC829C	Muting Control	3	**A**		
TR104, 105	2SC828R	Trigger & Switching Amp.	2	**A**		
TR301~305	2SC538P, Q, R	MPX Circuit	5	**A**		
TR306	2SC696I, H, F, E	DC Amplifier	1	**A**		
TR401	2SC562	AM RF Amplifier	1	**A**		
TR402~404	2SC645B, C	AM Converter, IF, AGC Amp.	3	**A**		
TR501~510	2SC644Q, R	Equalizer, Tone Amplifier	10	**A**		
TR513, 514	2SC538P, Q, R	Control Amplifier	2	**A**		

Bezugs Nr. / Ref. No.	Teil Nr. / Part No.	Bezeichnung / Description	Stückzahl Pro Gerät / Per Set (Pcs.)	Bemerkung / Remarks	Preise / Price	
TR515, 516	2SC697H,B,E,A,D	Driver Amplifier	2	A		
TR517~520	2SD218L, K	Power Amplifier	4	A		
TR601~604	2SC828R	Protection Circuit	4	A		
TR701	2SD91	Ripple Filter	1	A		
IC101, 102	RVILM703L-1 (LM703L)	FM 1st,2nd, IF Amp. (Red Marking)	2	A		
IC103, 104	RVILM703L-2 (LM703L)	FM 3rd, 4th IF Amp. (Green Marking)	2	A		

DIODEN
DIODES

D101~107	OA79	AGC, Muting Detector Diode	7	A		
D108, 109	2-OA79	Discriminator	1pair	A		
D301, 302, 305, 306	2-OA79	19kHz Doubler, MPX Detector Diode	2pair	A		
D303, 304	MA26	Stereo-Mono. Switching Diode	2	A		
D401, 402	OA91	Meter, AM Detector Diode	2	A		
D403~405	MA26	Voltage Regulator	3	A		
D501~504	RVDFR-1M (FR-1M)	Power Transistor Bias Regulator	4	A		
D601~603	OA91	Protection Circuit Diode	3	A		
D701, 702	RVDSD-1 (SD-1)	Sub Source Rectifier	2	A		
D703, 709	RVDRD13BM (RD13BM)	Rectifier, Zenner Diode	2	A		
D704~707	MA242	Main Source Rectifier	4	A		
D708	RVDSD-1Y (SD-1Y)	Stereo Indicator Rectifier	1	A		

SPULEN und TRANSFORMATOREN
COILS AND TRANSFORMERS

T101, 106, 108	SLIA4C15	FM 2nd(P), 4th(P), Mut. 2nd IFT	3	A		
T102, 103, 107, 109	SLIA4C17	FM 2nd(S),3rd(P),4th(S)& Mut. 2nd IFT	4	A		
T104	SLIA4C18	FM 3rd(S), MUT. 1st IFT	1	A		
T110	SLIA4C51	FM Detector Transformer(P)	1	A		
T111	SLIA4C52	FM Detector Transformer(S)	1	A		
T301	SLMA1C9-K	19kHz Pick-up Transformer(P)	1	A		
T302	SLMA1C11-K	19kHz Pick-up Transformer(S)	1	A		

Bezugs Nr. / Ref. No.	Teil Nr. / Part No.	Bezeichnung / Description	Stückzahl Pro Gerät / Per Set (Pcs.)	Bemerkung / Remarks	Preise / Price
T303	SLMA1C13-K	19kHz Doubler Transformer	1	A	
T304	SLMA1C15-K	38kHz Output Transformer	1	A	
T305~308	SLM1C17-T	67kHz, 38kHz, 19kHz Filter	4	B	
T309, 310	SLM1C19-T	38kHz Filter	2	B	
T401	SLD2C1	AM Detector Transformer	1	A	
T402	SLI2C105	AM 1st IF Transformer	1	A	
T403	SLI2C403	AM 2nd IF Transformer	1	A	
T501, 502	SLTA3I1	Power Amp. Input Transformer	2	A	
T601	SLTA3G1	Protection Transformer	1	Ⓝ A	
T701	SLTA7T1	Power Transformer	1	A	
T702	SLTA7L1S	Sub Transformer	1	Ⓝ A	
L101~107	SLQX151-1Y	RF Choke Coil	7	B	
L402	ELL6N59	AM Oscillator Coil	1	A	
L403	ELQ393D5999G	RF Choke Coil	1	B	
L401	SLFA2E1	AM Ferrite Antenna Coil	1	A	
L801	SLAA4W1-2	FM Antenna Balun Coil	1	A	
T105	SLIA4C23	Muting 1st IF Transformer	1	A	

WIDERSTÄNDE
RESISTORS

R581, 582	ERD12TJ270	27Ω, ½W, ± 5%, Carbon	2	B		
R583, 584, 896~899	ERD12TJ220	22Ω, ½W, ± 5%, Carbon	6	B		
R579, 580	ERD12TJ680	68Ω, ½W, ± 5%, Carbon	2	B		
R575, 576	ERD12TJ820	82Ω, ½W, ± 5%, Carbon	2	B		
R546, 547, 554, 560	ERD12TJ101	100Ω, ½W, ± 5%, Carbon	4	B		
R532, 533	ERD12TJ121	120Ω, ½W, ± 5%, Carbon	2	B		
R507, 508	ERD12TJ471	470Ω, ½W, ± 5%, Carbon	2	B		
R704	ERD12TJ681	680Ω, ½W, ± 5%, Carbon	1	B		
R852	ERD12TJ561	560Ω, ½W, ± 5%, Carbon	1	B		
R527	ERD12TJ102	1kΩ, ½W, ± 5%, Carbon	1	B		
R513, 514	ERD12TJ152	1.5kΩ, ½W, ± 5%, Carbon	2	B		
R534, 535, 550, 551, 587, 588	ERD12TJ222	2.2kΩ, ½W, ± 5%, Carbon	6	B		
R577, 578	ERD12TJ332	3.3kΩ, ½W, ± 5%, Carbon	2	B		

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Bezugs Nr. / Ref. No.	Teil Nr. / Part No.	Bezeichnung / Description	Stückzahl Pro Gerät / Per Set (Pcs.)	Bemerkung / Remarks	Preise / Price
R515, 516	ERD12TJ562	5.6kΩ, ½W, ± 5%, Carbon	2	B	
R536~539	ERD12TJ822	8.2kΩ, ½W, ± 5%, Carbon	4	B	
R521, 522, 525, 526, 563, 564	ERD12TJ153	15kΩ, ½W, ± 5%, Carbon	6	B	
R561, 562	ERD12TJ183	18kΩ, ½W, ± 5%, Carbon	2	B	
R542, 543	ERD12TJ223	22kΩ, ½W, ± 5%, Carbon	2	B	
R503, 504	ERD12TJ273	27kΩ, ½W, ± 5%, Carbon	2	B	
R505, 506, 544, 545, 573, 574	ERD12TJ333	33kΩ, ½W, ± 5%, Carbon	6	B	
R509, 510	ERD12TJ393	39kΩ, ½W, ± 5%, Carbon	2	B	
R511, 512	ERD12TJ473	47kΩ, ½W, ± 5%, Carbon	2	B	
R517, 518	ERD12TJ563	56kΩ, ½W, ± 5%, Carbon	2	B	
R528, 529	ERD12TJ104	100kΩ, ½W, ± 5%, Carbon	2	B	
R540, 541	ERD12TJ124	120kΩ, ½W, ± 5%, Carbon	2	B	
R555, 556	ERD12TJ154	150kΩ, ½W, ± 5%, Carbon	2	B	
R523, 524	ERD12TJ184	180kΩ, ½W, ± 5%, Carbon	2	B	
R548, 549	ERD12TJ274	270kΩ, ½W, ± 5%, Carbon	2	B	
R530, 531, 557, 558	ERD12TJ474	470kΩ, ½W, ± 5%, Carbon	4	B	
R326, 519, 520	ERD12TJ824	820kΩ, ½W, ± 5%, Carbon	3	B	
R323	ERD12TJ684	680kΩ, ½W, ± 5%, Carbon	1	B	
R585, 586	ERD12TJ103	10kΩ, ½W, ± 5%, Carbon	2	B	
R552, 553	ERD12TJ123	12kΩ, ½W, ± 5%, Carbon	2	B	
R906, 907	ERD14TJ150	15Ω, ¼W, ± 5%, Carbon	2	B	
R620	ERD14TJ560	56 Ω, ¼W, ± 5%, Carbon	1	B	
R134, 403	ERD14TJ101	100Ω, ¼W, ± 5%, Carbon	2	B	
R136, 331 820~825	ERD14TJ221	220Ω, ¼W, ± 5%, Carbon	8	B	
R314, 590, 591	ERD14TJ271	270Ω, ¼W, ± 5%, Carbon	3	B	
R832, 833	ERD14TJ471	470Ω, ¼W, ± 5%, Carbon	2	B	
R303	ERD14TJ681	680Ω, ¼W, ± 5%, Carbon	1	B	
R304, 318, 322, 603, 604	ERD14TJ102	1kΩ, ¼W, ± 5%, Carbon	5	B	
R305, 309, 701	ERD14TJ122	1.2kΩ, ¼W, ± 5%, Carbon	3	B	
R111, 122, 840, 841	ERD14TJ152	1.5kΩ, ¼W, ± 5%, Carbon	4	B	
R135, 611, 607~609 601, 602	ERD14TJ222	2.2kΩ, ¼W, ± 5%, Carbon	7	B	
R113, 838	ERD14TJ332	3.3kΩ, ¼W, ± 5%, Carbon	2	B	
R312, 618 834~837	ERD14TJ472	4.7kΩ, ¼W, ± 5%, Carbon	6	B	
R622, 316	ERD14TJ123	12kΩ, ¼W, ± 5%, Carbon	2	B	

Bezugs Nr. / Ref. No.	Teil Nr. / Part No.	Bezeichnung / Description	Stückzahl Pro Gerät / Per Set (Pcs.)	Bemerkung / Remarks	Preise / Price	
R306, 815, 816	ERD14TJ562	5.6kΩ, ¼W, ± 5%, Carbon	3	B		
R617, 813, 814, 850, 851	ERD14TJ103	10kΩ, ¼W, ± 5%, Carbon	5	B		
R616	ERD14TJ153	15kΩ, ¼W, ± 5%, Carbon	1	B		
R612, 619	ERD14TJ223	22kΩ, ¼W, ± 5%, Carbon	2	B		
R406	ERD14TJ333	33kΩ, ¼W, ± 5%, Carbon	1	B		
R302, 307, 610, 313, 801, 804, 807, 808, 817, 819	ERD14TJ563	56kΩ, ¼W, ± 5%, Carbon	10	B		
R621, 623	ERD14TJ393	39kΩ, ¼W, ± 5%, Carbon	2	B		
R315	ERD14TJ473	47kΩ, ¼W, ± 5%, Carbon	1	B		
R349, 348	ERD14TJ104	100kΩ, ¼W, ± 5%, Carbon	2	B		
R308	ERD14TJ124	120kΩ, ¼W, ± 5%, Carbon	1	B		
R615, 605, 606	ERD14TJ154	150kΩ, ¼W, ± 5%, Carbon	3	B		
R301, 501, 502	ERD14TJ224	220kΩ, ¼W, ± 5%, Carbon	3	B		
R613	ERD14TJ184	180kΩ, ¼W, ± 5%, Carbon	1	B		
R802, 805, 809, 812	ERD14TJ474	470kΩ, ¼W, ± 5%, Carbon	4	B		
R810, 811	ERD14TJ823	82kΩ, ¼W, ± 5%, Carbon	2	B		
R106, 116, 127	ERD14VJ470	47Ω, ¼W, ± 5%, Carbon	3	B		
R103, 123, 124, 405, 414, 424	ERD14VJ101	100Ω, ¼W, ± 5%, Carbon	6	B		
R404	ERD14VJ181	180Ω, ¼W, ± 5%, Carbon	1	B		
R105, 110, 117, 402, 409	ERD14VJ221	220Ω, ¼W, ± 5%, Carbon	5	B		
R115	ERD14VJ181	180Ω, ¼W, ± 5%, Carbon	1	B		
R125, 413	ERD14VJ471	470Ω, ¼W, ± 5%, Carbon	2	B		
R416	ERD14VJ681	680Ω, ¼W, ± 5%, Carbon	1	B		
R107, 422	ERD14VJ821	820Ω, ¼W, ± 5%, Carbon	2	B		
R311, 319, 321, 330, 401, 410, 411	ERD14VJ102	1kΩ, ¼W, ± 5%, Carbon	7	B		
R129, 130, 415, 418	ERD14VJ152	1.5kΩ, ¼W, ± 5%, Carbon	4	B		
R407	ERD14VJ182	1.8kΩ, ¼W, ± 5%, Carbon	1	B		
R420	ERD14VJ272	2.7kΩ, ¼W, ± 5%, Carbon	1	B		
R102, 419	ERD14VJ332	3.3kΩ, ¼W, ± 5%, Carbon	2	B		
R317, 324, 325	ERD14VJ472	4.7kΩ, ¼W, ± 5%, Carbon	3	B		
R340, 341, 408, 417, 118	ERD14VJ562	5.6kΩ, ¼W, ± 5%, Carbon	5	B		
R131, 133, 327~329, 421	ERD14VJ103	10kΩ, ¼W, ± 5%, Carbon	6	B		
R126, 128	ERD14VJ153	15kΩ, ¼W, ± 5%, Carbon	2	B		
R310, 423	ERD14VJ223	22kΩ, ¼W, ± 5%, Carbon	2	B		
R119	ERD14VJ333	33kΩ, ¼W, ± 5%, Carbon	1	B		

Bezugs Nr. / Ref. No.	Teil Nr. / Part No.	Bezeichnung / Description	Stückzahl Pro Gerät / Per Set (Pcs.)	Bemerkung / Remarks	Preise / Price
R 344, 345	ERD14VJ563	56kΩ, ¼W, ± 5%, Carbon	2	B	
R 104, 132, 342 346, 412, 343	ERD14VJ104	100kΩ, ¼W, ± 5%, Carbon	6	B	
R 109	ERD14VJ124	120kΩ, ¼W, ± 5%, Carbon	1	B	
R 320	ERD14VJ184	180kΩ, ¼W, ± 5%, Carbon	1	B	
R 108	ERD14VJ224	220kΩ, ¼W, ± 5%, Carbon	1	B	
R 589	ERM2P331	330Ω, 2W, ± 5%, Wire	1	C	
R 900~903	ERM2PR33	0.33Ω, 2W, ±10%, Wire	4	C	
R 818, 826, 827	ERM2PR68	0.68Ω, 2W, ±10%, Wire	3	C	
R 904, 905	ERM4P150	15Ω, 4W, ± 5%, Wire	2	C	
R 830, 831	ERM4P271	270Ω, 4W, ± 5%, Wire	2	C	
R 828, 829	ERM6P271	270Ω, 6W, ± 5%, Wire	2	C	
R 702, 703	ERM8P331	330Ω, 8W, ± 5%, Wire	2	C	
R 592~595	ERM10H431	430 Ω, 8W, ± 5%, Wire	4	C	

EINSTELLWIDERSTANDE
VARIABLE RESISTORS

VR 121	EVLSOAAOOB13	Muting Adj. 1kΩ (B)	1	A		
VR 114, 401	EVLTOAAOOB14	FM & AM Meter Adj. 10kΩ (B)	2	A		
VR 301	EVLS3AAOOB14	Separation Adj. (Left) 10kΩ (B)	1	A		
VR 302	EVLS3AAOOB24	Separation Adj. (Right) 20kΩ (B)	1	A		
VR 120, 809, 810	EVHB0AS10B54	Muting, Tape Equ. Adj. 50kΩ (B)	3	A		
VR 803, 804	EVGK1AU25B54	Volume Control 50kΩ (B)	1	A		
VR 801, 802	EVFK0AU25368	Balance Control 50kΩ (A),(C)	1	A		
VR 805~808	EVFF0AN16M54	Treble & Bass Control 50kΩ	2	A		
VR 503~506	EVWJ0AS08B51	Icq & DC Unbalance Adj. 50Ω (B)	4	A		

KONDENSATOREN
CAPACITORS

C 129	ECKE05102MY	0.001mfd, 50WV, ±20%, Ceramic	1	C		
C 407	ECKE05103MY	0.01mfd, 50WV, ±20%. Ceramic	1	C		

Bezugs Nr. / Ref. No.	Teil Nr. / Part No.	Bezeichnung / Description	Stückzahl Pro Gerät / Per Set (Pcs.)	Bemerkung / Remarks	Preise / Price
C 101, 104, 105, 106, 113~116, 124, 126, 130, 132, 136, 402, 123	ECKE05103P	0.01mfd, 50WV, +100% −0%, Ceramic	15	C	
C 122	ECKE05223P	0.022mfd, 50WV, +100% −0%, Ceramic	1	C	
C 403, 405, 406, 410, 412, 571, 572, 712, 713	ECKE05333P	0.033mfd, 50WV, +100% −0%, Ceramic	9	C	
C 701, 702	ECKD5103P	0.01mfd, 50WV, +100% −0%, Ceramic	2	C	
C 413	ECKD5471K	470mmf, 50WV, ± 10%, Ceramic	1	C	
C 802, 803	ECKD5821K	820mmf, 50WV, ± 10%, Ceramic	2	C	
C 125, 139	ECCD051R5CC	1.5mmf, 50WV, ±0.25mmf, Ceramic	2	C	
C 103, 110, 121	ECCD05020C	2mmf, 50WV, ±0.25mmf, Ceramic	3	C	
C 401, 404	ECCD05100KC	10mmf, 50WV, ±10%, Ceramic	2	C	
C 111	ECCD05150KC	15mmf, 50WV, ±10%, Ceramic	1	C	
C 117, 408	ECCD05220KC	22mmf, 50WV, ±10%, Ceramic	2	C	
C 128	ECCD05470K	47mmf, 50WV, ±10%, Ceramic	1	C	
C 112	ECCD05180KC	18mmf, 50WV, ±10%, Ceramic	1	C	
C 134, 807, 808	ECCD05221K	220mmf, 50WV, ±10%, Ceramic	3	C	
C 323, 324, 519, 520, 551, 552, 806	ECCD05331K	330mmf, 50WV, ±10%, Ceramic	7	C	
C 505, 506, 539, 540	ECCD05151K	150mmf, 50WV, ±10%, Ceramic	4	C	
C 561, 562, 329, 330	ECQG05102KZN	0.001 mfd, 50WV, ±10%, Polyester	4	C	
C 325, 326,	ECQG05152KZN	0.0015mfd, 50WV, ±10%, Polyester	2	C	
C 317, 327, 328	ECQG05222KZN	0.0022mfd, 50WV, ±10%, Polyester	3	C	
C 315, 811, 812, 333, 334	ECQG05332KZN	0.0033mfd, 50WV, ±10%, Polyester	5	C	
C 515, 516	ECQG05472KZN	0.0047mfd, 50WV, ±10%, Polyester	2	C	
C 513, 514, 529, 530	ECQG05682KZN	0.0068mfd, 50WV, ±10%, Polyester	4	C	
C 531, 532	ECQG05103KZZ	0.01mfd, 50WV, ±10%, Polyester	2	C	
C 517, 518	ECQG05153KZN	0.015mfd, 50WV, ±10%, Polyester	2	C	
C 815, 816	ECQG05223KZN	0.022mfd, 50WV, ±10%, Polyester	2	C	
C 102, 108, 109, 118, 120, 135, 137, 421, 533, 534, 549, 550, 563, 564, 141, 143	ECQG05333KZN	0.033mfd, 50WV, ±10%, Polyester	16	C	
C 305, 308, 813, 814	ECQG05473KZN	0.047mfd, 50WV, ±10%, Polyester	4	C	
C 804, 805	ECQG05104KZN	0.1mfd, 50WV, ±10%, Polyester	2	C	
C 142, 144, 818, 819, 306	ECQG05224KZN	0.22mfd, 50WV, ±10%, Polyester	5	C	
C 419	ECQG05154KZN	0.15mfd, 50WV, ±10%, Polyester	1	C	
C 127, 303, 409	ECQS1371JZ	370mmf, 125WV, ± 5%, Styrol	3	C	
C 309	ECQS1332KZ	0.0033mfd, 125WV, ±10%, Styrol	1	C	
C 302, 304, 307	ECQS1472KZ	0.0047mfd, 125WV, ±10%, Styrol	3	C	
C 318	ECQS1152JZ	0.0015mfd, 125WV, ± 5%, Styrol	1	C	

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Bezugs Nr. / Ref. No.	Teil Nr. / Part No.	Bezeichnung / Description	Stückzahl Pro Gerät / Per Set (Pcs.)	Bemerkung / Remarks	Preise / Price
C319	ECQS1601JZ	600mmf, 125WV, ± 5%, Styrol	1	C	
C411	ECQS05152KZ	0.0015mfd, 50WV, ±10%, Styrol	1	C	
C320	ECQS05182KZ	0.0018mfd, 50WV, ±10%, Styrol	1	C	
C107, 415	ECAG25ER1	0.1mfd, 25WV, Electrolytic	2	B	
C535~538	ECAG25ER15	0.15mfd, 25WV, Electrolytic	4	B	
C331, 332	ECAG25ER47	0.47mfd, 25WV, Electrolytic	2	B	
C511, 512, 523, 524, 545, 546	ECSY25EF1	1mfd, 25WV, Electrolytic	6	B	
C501, 502	ECSZ16EG10	10mfd, 16WV, Electrolytic	2	B	
C414, 507, 508, 527, 528	ECEA6V33	33 mfd, 6.3WV, Electrolytic	5	B	
C503, 504, 553, 554, 801	ECEA6V220	220mfd, 6.3WV, Electrolytic	5	B	
C131, 301	ECEA16V10	10mfd, 16WV, Electrolytic	2	B	
C322, 416, 509, 510, 541, 542	ECEA16V33	33mfd, 16WV, Electrolytic	6	B	
C604	ECEA10V10	10mfd, 10WV, Electrolytic	1	B	
C119	ECEA16V47	47mfd, 16WV, Electrolytic	1	B	
C311, 314, 417, 418	ECEA16V100	100mfd, 16WV, Electrolytic	4	B	
C714	ECEA16V470	470mfd, 16WV, Electrolytic	1	B	
C310, 525, 526, 543, 544, 603	ECEA25V3R3	3.3mfd, 25WV, Electrolytic	6	B	
C133	ECEA25V4R7	4.7mfd, 25WV, Electrolytic	1	B	
C312, 313, 316	ECEA25V10	10mfd, 25WV, Electrolytic	3	B	
C557, 558, 573, 521	ECEA25V470N	470mfd, 25WV, Electrolytic	4	B	
C555, 556	ECEA25V220	220mfd, 25WV, Electrolytic	2	B	
C138, 335, 420	ECEA50V1	1mfd, 50WV, Electrolytic	3	B	
C522, 566	ECEA50V100	100mfd, 50WV, Electrolytic	2	B	
C547, 548	ECEA50V10	10mfd, 50WV, Electrolytic	2	B	
C709, 710	ECEM50R5000Z	5000mfd, 50WV, Electrolytic	2	B	
C711	ECEB10V1000	1000mfd, 10WV, Electrolytic	1	B	
C565, 703, 704	ECEB50V470	470mfd, 50WV, Electrolytic	3	B	
C574	ECEA50V220	220mfd, 50WV, Electrolytic	1	B	
C601, 602	ECEA25N33	33mfd, 25WV, Electrolytic	2	B	
C820	ECEA50V33	33mfd, 50WV, Electrolytic	1	B	
C559, 560, 705, 706, 708	ECHS1104M	0.1mfd, 125WV, ±20%, Paper	5	C	
C810	ECNU4A102M	0.001mfd, 400WV, ±20%, Paper	1	C	
C809, 817	ECNU4A103M	0.01mfd, 400WV, ±20%, Paper	2	C	

Bezugs Nr. / Ref. No.	Teil Nr. / Part No.	Bezeichnung / Description	Stückzahl Pro Gerät / Per Set (Pcs.)	Bemerkung / Remarks	Preise / Price	

EINSTELLKONDENSATOREN
VARIABLE CAPACITOR

CV 401~403 CT 401~403	ECV3AN34B12	AM Variable Capacitor and Trimmer	1	A		

KOMPONENTE KOMBINATION
COMPONENT COMBINATION

CR 101	EXA5DL04C	FM Detector Circuit	1	B		
CR 401	EXAF203Z471	AM Detector Circuit	1	B		

THERMISTOR
THERMISTOR

TH 601	RRT103	Protection Circuit 10kΩ	1	A		

SCHALTER
SWITCHS

S 1~9	SSRAC5A7L25A	Selector Switch	1	B		
S 10~14	ESL1411S	Loudness, High, Low Filters, Tape Monitor, Muting Switch	1	B (150)		
S 15, 21	ESRC135L20EV	Speaker Change, Power Source Switch	1	B		
S 16~18	ESRE245L25AE	Mode Selector Switch	1	B		
S 19, 20	ESRC244SISX	Power Source Selector Switch	1	B		

GEHÄUSE
CABINET

CA 1	SBNA15-1	Knob, Power/Speakers Switch	1	A		
CA 2	SBNA16	Knob, Bass & Treble (Inside)	2	A		
CA 3	SSMA1-1	Tuning Meter	1	A		
CA 4	SYEA5	Panel	1	C		
CA 5	SKAA120	Cabinet	1	C		

Bezugs Nr. / Ref. No.	Teil Nr. / Part No.	Bezeichnung / Description	Stückyahl Pro Gerät / Per Set (Pcs.)	Bemerkung / Remarks	Preise / Price
CA 6	SKDA120	Scale, Dial	1	Ⓝ B	
CA 7	SBNA15	Knob, Tuning	1	A	
	XSN4D25S (DM4-25S)	Screw, Cabinet M'tg.	4	B ISO	
CA 8	SJJ13	Jack, Head Phones	1	B	
CA 9	SBNA17-1	Knob, Bass & Treble (Outside)	2	A	
CA 10	SBNA14	Knob, Balance & Volume	2	A	
CA 11	SBCA2-2	Button Loudness, Filters, Muting Tape-Monitor Switch	5	A	
CA 12	SBNA18	Knob, Mode & Selector Switch	2	A	
CA 13	SJJ7-1	Jack, Microphone	2	B	
CA 14	RJF4205	AM & FM Antenna Terminal	2	C	
CA 15	SNEA404	Nut, Ground Terminal	1	C	
CA 16	SJF3201	Preout-Main in & REC/PLAY Terminal	4	C	
CA 17	SJP2103	Short Pin	2	B	
CA 18	SMNA83	Rear Panel	1	C	
CA 19	SGTA161	Name Plate	1	Ⓝ C	
CA 20	SJP9103	Short Pin-Plug	2	B	
CA 21	SJF3405	Input Terminal	2	C	
CA 22	RJS31-1	DIN Socket	1	B	
CA 23	SJFA4801S	Speaker Terminal	1	C ISO	
CA 24	SJFA101	Holder, Fuse	1	C	
CA 25	RJA30	Cord, AC Power Source	1	B	
	RJA39	Cord, AC Power Source (German)			
CA 26	RHR111	Grommet, AC Cord	1	C	

CHASSIS

CHASSIS

CH 1	XAM43T	Light, Dial Scale 12.6V 0.3A	2	A	
CH 2	XAM35T	Light, 6.3V 0.25A	7	A	
CH 3	RDR20	Pulley	4	C	
CH 4	SDPA1004	Pointer	1	A	
CH 5	RDZ05-5	Cord Dial (120")	300 cm	B	
CH 6	SDEA4-1	Indicatar, Dial Scale	1	B	
CH 7	SDTA4181S	Tuning Shaft	1	A ISO	

Bezugs Nr. / Ref. No.	Teil Nr. / Part No.	Bezeichnung / Description	Stückzahl Pro Gerät / Per Set (Pcs.)	Bemerkung / Remarks	Preise / Price
CH8	SDDA2027S	27φ Drum	1	B ISO	
CH9	SDGA1S	Gear	1	C ISO	
CH10	SDDA1	Gear Drum	1	B	
	RDS409	Spring, Drum	3	A	
CH11	SDDA9001	Cover, Gear Drum	1	B	
CH12	RDR8	Pulley	2	C	
	SKUA71	Bottom Board	1	B	
	XTB3+8B (STB3—8)	Screw, Bottom Board M'tg.	14	C	
	SDGA701	Spring, Gear	1	B	
	XTN23D6B (DSTR2.3—6)	Screw, Drum Cover M'tg.	2	C	
	XBAIF30NM100	Fuse 3A	1	A	

ZUBEHÖR

ACCESSORIES

A1	SSAA1	Cord, FM Antenna	1	B	
A2	RJP74	Plug, Power Source Pich(16.7mm)	1	B	
A3	RJP75	Plug, Power Source Pich(19mm)	1	B	
A4	RJP5	Pin-Plug	4	B	

VERPACKUNG

PACKING

P1	SPPA14	Soft Cover	1	C	
P2	SPH77	Polyethylene AC Cord Cover	1	C	
P3	SPHA6003	Polyethylene Sheet	1	C	
P4	SPNA70	Side Pad	1	C	
P5	SPNA71-1	Inside Carton	1	C	
P6	SPNA69	Carton Box (Inner)	1	C	
P7	SPNA95	Top Board	1	C	
P8	SPGA56	Carton Box (Outer)	1	C	
P9	SQFA50	Printed Matter	1	B	